MG2.1E
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Service
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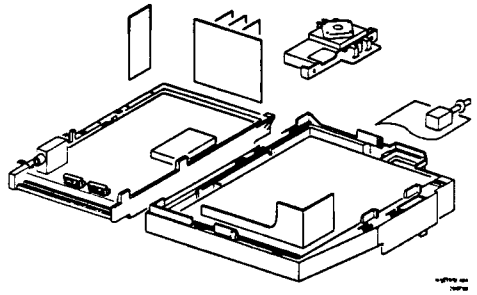

Service Manual

Provisional

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PHILIPS

1 Technical specifications

- Mains voltage: 220V - 240V (± 10%); 50-60Hz (± 5%)
- Aerial input impedance: coaxial 75 Ω
- Minimal aerial voltage: 30µV (VHF), 40µV (UHF)
- Maximum aerial voltage:180 mV
- Programmes: 0-99
- VCR programmes: 0, 90-99

2 Specification connections

2.1 Front connections

TOP CONTROL FL7/FL8 STYLING

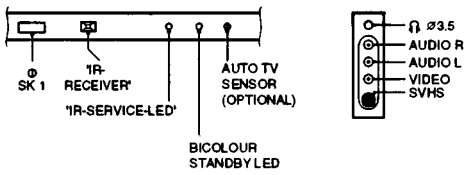

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Figure 2-1

2.1.1 Audio/Video

Video	1Vpp/75Ω	
Audio	L(0.5Vrms ≥10kΩ)	
Audio	R(0.5Vrms ≥10kΩ)	
Headphone	(32-600Ω ≥10mW)	

2.1.2 SVHS

1-		
2-		
3- Y	(1Vpp; 75Ω)	
4- C	(0.3 Vpp;75Ω)	

2.2 Rear connections

See figure 2.2

2.2.1 External 1(in/out): RGB+CVBS

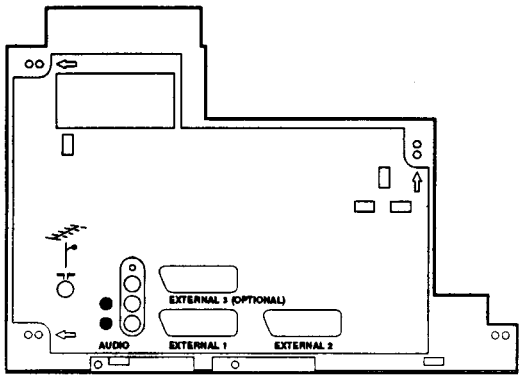

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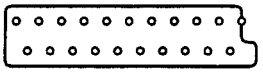
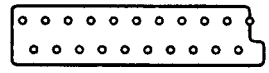
Figure 2-2



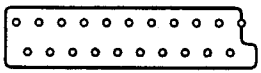
1- Audio	R (0.5Vrms ≤1kΩ)	
2- Audio	R (0.5Vrms ≥10kΩ)	
3- Audio	L (0.5Vrms ≤1kΩ)	
4- Audio		
5- Blue		
6- Audio	L (0.5Vrms ≥10kΩ)	
7- Blue	(0.7Vpp/75Ω)	
8- CVBS-status	0-1.3V:INT	
	4.5-7V:EXT 16:9	
	9.5-12V:EXT 4:3	
9- Green		
10-		
11- Green	(0.7Vpp/75Ω)	
12-		
13- Red		
14- RGB-status		
15- Red	(0.7Vpp/75Ω)	
16- RGB-status	0-0.4V:INT	
	1-3V:EXT/75Ω	
17- CVBS		
18- CVBS		
19- CVBS	(1Vpp/75Ω)	
20- CVBS	(1Vpp/75Ω)	
21- Earth socket		

2.2.2 External 2 (in/out): SVHS+RGB+CVBS (intended for VCR.)



1- Audio	R (0.5Vrms ≤1kΩ)	
2- Audio	R (0.5Vrms ≥10kΩ)	
3- Audio	L (0.5Vrms ≤1kΩ)	
4- Audio		
5- Blue		
6- Audio	L (0.5Vrms ≥10kΩ)	
7- Blue / Chroma out	(0.7Vpp/75Ω)	
8- CVBS-status	0-1.3V:INT	
	4.5-7V:EXT 16:9	
	9.5-12V:EXT 4:3	
9- Green		
10-	Easy link	
11- Green	(0.7Vpp/75Ω)	
12-		
13- Red		
14- RGB-status		
15- Red / chroma-in	(0.7Vpp/75Ω)	
16- RGB-status	(0-0.4V:INT	
	1-3V:EXT/75Ω)	
17- CVBS		
18- CVBS		
19- Y/CVBS	(1Vpp/75Ω)	
20- Y/CVBS	(1Vpp/75Ω)	
21- Earth socket		

2.2.3 *External 3 (in): CVBS+Audio (optional)*



1 -			
2 -	Audio	R (0.5Vrms >10kΩ)	⊕
3 -			
4 -	Audio		⊥
5 -			
6 -	Audio	L (0.5Vrms>10kΩ)	⊕
7 -			
8 -	CVBS-status	0-1.3V:INT	
		4.5-7V:EXT 16:9	
		9.5-12V:EXT 4:3	⊕
9 -			
10 -			
11 -			
12 -			
13 -			
14 -			
15 -			
16 -			
17 -	CVBS		⊥
18 -	CVBS		⊥
19 -			
20 -	CVBS	(1Vpp/75Ω)	⊕
21 -	Earth socket		

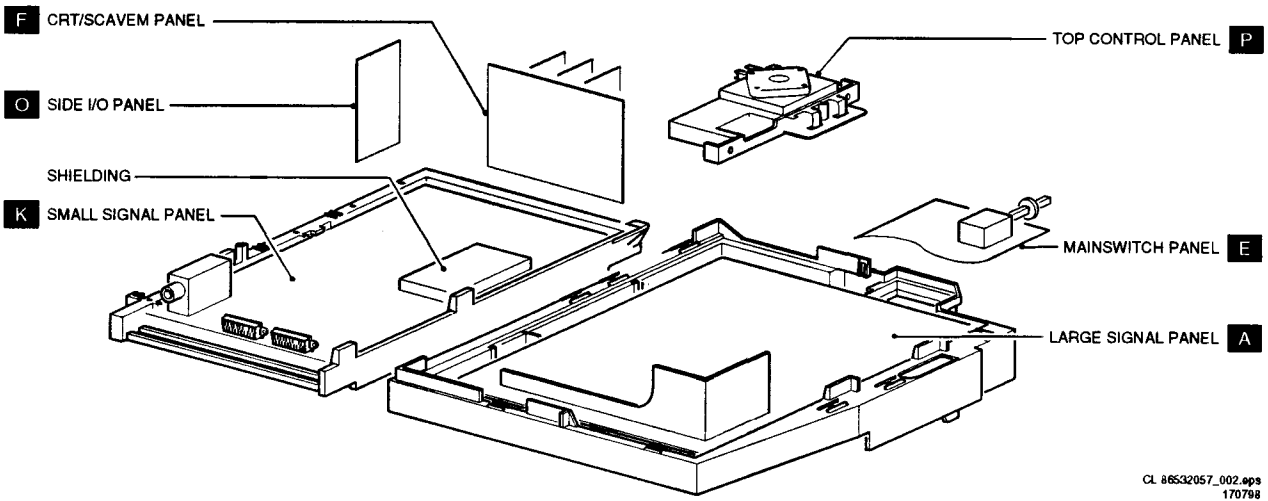


Figure 2-3

3 Safety instructions, Maintenance instruction,

3.1 Safety instructions for repairs

Safety regulations require that during a repair:
- the set should be connected to the mains via an isolating transformer;
- safety components, indicated by the symbol Δ, should be replaced by components identical to the original ones;
- when replacing the CRT, safety goggles must be worn.

2. Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points. h
   - As a strict precaution, we advise you to resolder the solder joints through which the horizontal deflection current is flowing, in particular: ('general repair instruction')
     - all pins of the line output transformer (LOT);
     - fly-back capacitor(s);
     - S-correction capacitor(s);
     - line output transistor;
     - pins of the connector with wires to the deflection coil;
     - other components through which the deflection current flows.

     Note:
     This resoldering is advised to prevent bad connections due to metal fatigue in solder joints and is therefore only necessary for television sets older than 2 years.

   The wire trees and EHT cable should be routed correctly and fixed with the mounted cable clamps.
   The insulation of the mains lead should be checked for external damage.
   The mains lead strain relief should be checked for its function in order to avoid touching the CRT, hot components or heat sinks.
   The electrical DC resistance between the mains plug and the secondary side should be checked (only for sets which have a mains isolated power supply). This check can be done as follows:
   - unplug the mains cord and connect a wire between the two pins of the mains plug;
   - set the mains switch to the on position (keep the mains cord unplugged!);
   - measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MW and 12 MW;
   - switch off the TV and remove the wire between the two pins of the mains plug.

   The cabinet should be checked for defects to avoid touching of any inner parts by the customer.

3.2 Maintenance instruction

It is recommended to have a maintenance inspection carried out by a qualified service employee. The interval depends on the usage conditions:
- When the set is used under normal circumstances, for example in a living room, the recommended interval is 3 to 5 years.
- When the set is used in circumstances with higher dust, grease or moisture levels, for example in a kitchen, the recommended interval is 1 year.
- The maintenance inspection contains the following actions:
  - Execute the above mentioned 'general repair instruction'.
  - Clean the power supply and deflection circuitry on the chassis.
  - Clean the picture tube panel and the neck of the picture tube.

3.3 Warnings

1. In order to prevent damage to ICs and transistors, all high-voltage flashovers must be avoided. In order to prevent damage to the picture tube, the method shown in Fig. 3.1 should be used to discharge the picture tube. Use a high-voltage probe and a multimeter (position DC-V). Discharge until the meter reading is 0V (after approx. 30s).
2. ESD All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
   - Available ESD protection equipment:
   - anti-static table mat (large 1200x650x1.25mm) 4822 466 10953
   - anti-static table mat (small 600x650x1.25mm) 4822 466 10958
   - anti-static wristband 4822 395 10223
   - connection box (3 press stud connections, 1 M ohm) 4822 320 11307
   - extension cable (2 m, 2 M ohm; to connect wristband to connection box) 4822 320 11305
   - connecting cable (3 m, 2 M ohm; to connect table mat to connection box) 4822 320 11306
   - earth cable (1 M ohm; to connect any product to mat or connection box) 4822 320 11308
   - complete kit ESD3 (combining all 6 prior products - small table mat) 4822 310 10671
   - wristband tester 4822 344 13999
3. Together with the deflection unit and any multipole unit, the flat square picture tubes used from an integrated unit. The deflection and the multipole units are set optimally at the factory. Adjustment of this unit during repair is therefore not recommended.
4. Be careful during measurements in the high-voltage section and on the picture tube.
5. Never replace modules or other components while the unit is switched on.
6. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.
7. Wear safety goggles during replacement of the picture tube

3.4 Notes

1. The direct voltages and oscillograms should be measured with regard to the tuner earth (⊥), or hot earth (⊥) as this is called.
2. The direct voltages and oscillograms shown in the diagrams are indicative and should be measured in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L:3 kHz, R:1 kHz unless stated otherwise) and picture carrier at 475.25 MHz.
3. Where necessary, the oscillograms and direct voltages are measured with (⊥) and without aerial signal (⊥). Voltages in the power supply section are measured both for normal operation (⊥) and in standby (⊥). These values are indicated by means of the appropriate symbols.
4. The picture tube PWB has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
5. The semiconductors indicated in the circuit diagram and in the parts lists are completely interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.
6. Manufactured under license from Dolby Laboratories Licensing Corporation.
7. DOLBY, the double D symbol and PRO LOGIC are trademarks of Dolby Laboratories Licensing Corporation.

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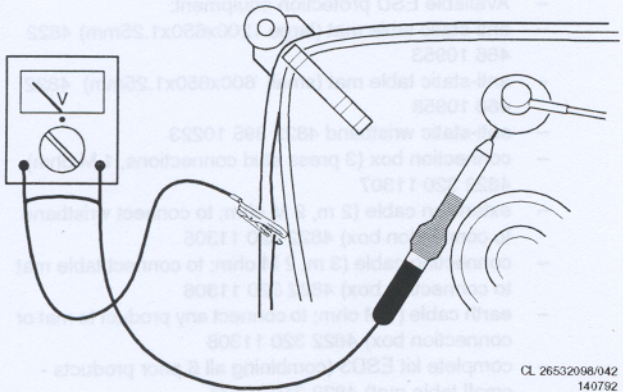

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4 Mechanical instructions

4.1 Removing the rear cover

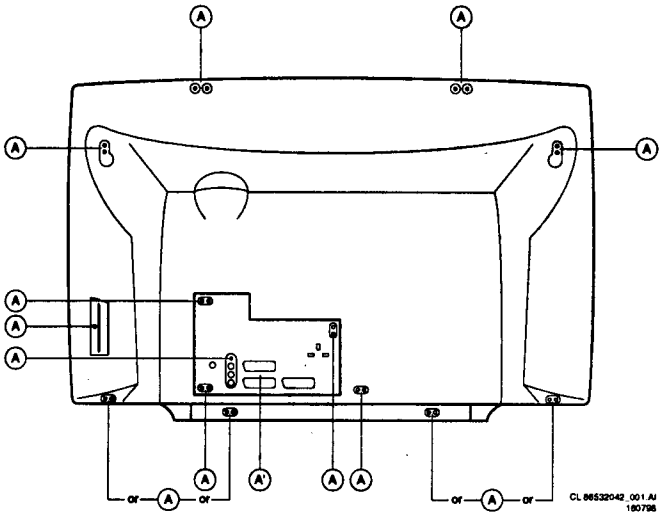

Figure 4-1

1. Remove the fixation screws (A) of the rear cover, notice also the side-I/O-screw; see figure 4.1 (A') screw only valid for 3-scart configuration.
2. Remove the rear cover.

4.2 Service positions

There are two predefined service positions

1. Service position for the top side (component-side)
2. Service position for the bottom side (only valid for LSP) (copper-side)

4.2.1 *Service position top side*

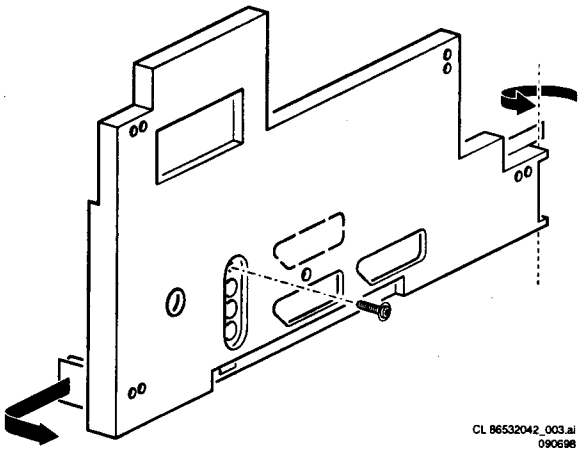

Figure 4-2

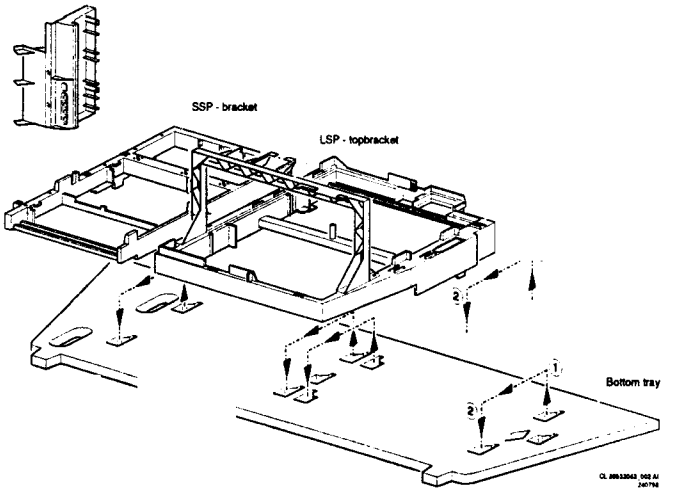

Figure 4-3

1. Remove 1 screw in case of 2-scart I/O-backplate and 2 screws in case of a 3-scart I/O-backplate. (See figure 4.2)
2. Remove I/O-backplate by releasing snap at left side. Pull to left and backwards. The I/O-bracket hinges at the right side. It can be removed now.
3. Pull backwards (about 8 cm) the bracket with the SSP and the LSP. These brackets are not fixed to each other, but can be repositioned backwards, as if they were one bracket.
4. Hook the brackets in the first row of fixation-holes of the bottom tray; see figure 4.3. In other words re-position the fixation from (1) TO (2)

4.2.2 *Service position bottom side (only for LSP)*

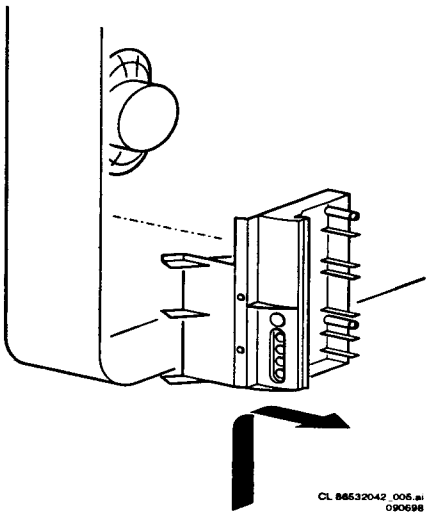

Figure 4-4

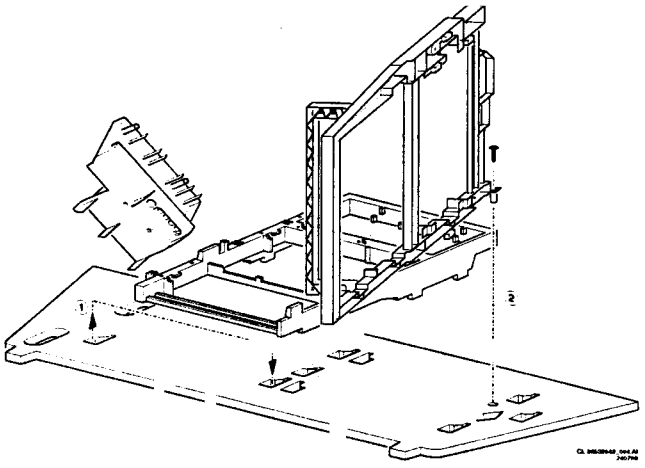

Figure 4-5

1. Referring to previous Service position one must remove the SSP and LSP from bottom tray by pulling back these two panels.
2. Disconnect the SSP from the LSP bracket
3. The two panels must be shifted some 25 cm to the right. When doing this the side-assembly can be taken out of the hinge (see figure 4.4), and placed on the bottom tray.
4. Either the LSP-topbracket must be removed first, or the cabling from SSP to LSP (0310 and O311) must be re-routed outside the LSP-topbracket to get room to position these panels
5. Turn the LSP 90 degrees anti clock wise and place the LSP in the hole of the bottom tray. If needed a screw can reinforce the stability of this position. (see figure 4.5) (See (2).
6. The left front hook of the SSP panel can be fixed in a fixation-hole, that was used in previous service-position for the right front hook of the SSP. See described movement-action (1). (there is no right fixation hole)

4.2.3 (Service position bottom side SSP)

1. In fact there is no service position for the bottom of the SSP. Almost all components are present on the component-side. All test points are located on the component-side.
2. If ICs must be replaced take the complete panel out. If still a service-position is needed take SSP out of bracket and rotate it so that one (sitting behind the set) sees the copper-side of the SSP, with Tuner pointed to the upper-side.

4.3 Removing the LSP-top bracket

1. (See figure 4.3). Remove the two fixation screws of the LSP-topbracket (one on the left hand side, one on the right hand side)
2. Disconnect wirings from cable-clamps of LSP-topbracket
3. In case the line transformer is changed by a bigger type a part of the LSP-topbracket can be removed by breaking it

4.4 Removing the SSP from SSP-bracket

1. Release the three fixation clamps on the right hand side of the bracket
2. Press the board upwards and remove the board from the bracket

4.5 Removing the LSP from LSP-bracket

1. Release the two fixation clamps on the right hand side of the bracket
2. Press the board upwards and remove the board from the bracket

4.6 Removing the top control board

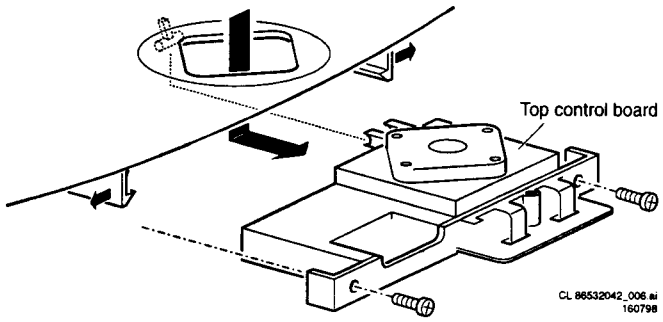

Figure 4-6

1. See figure 4.6. Pull 2 clamps to the outer side
2. Top control board can be pushed down now, while it hinges still in the front
3. Now the board can be pulled backwards
4. (If by accident the hinge in front is damaged or one of the clamps is broken, the top control board can also be fixed by 2 screws)

4.7 Removing the side I/O board

1. The complete Side I/O-assembly can be lifted out of the hinges and placed on the bottom tray of the set. (see fig 4.3)
2. The pcb can easily be removed out of the bracket by releasing the fixation clamps

4.8 Removing the mains switch/LED board

1. Release the two fixation clamps
2. Pull the board backwards

4.9 Mounting the rear cover

Before mounting the rear cover, check whether the mains cord is mounted correctly in the guiding brackets

5 Service modes, error codes and protections

In this chapter the following paragraphs are included:
5.1 Test points
5.2 Service modes, Dealer Service Tool and Compair (including fault finding tips related to CSM-mode)
5.3 Error codes
5.4 Protections
5.5 Fault find tree

5.1 Test points

The MG2.1E chassis is equipped with test points in the service printing. These test points are referring to the functional blocks:

P1-P2-P3, etc: Test points for the power supply
L1-L2-L3, etc: Test points for the line drive and line output circuitry
F1-F2-F3, etc on Small Signal Panel: Test points for the frame drive
F1-F2-F3, etc. on CRT/Scavem Panel: Test points for the CRT-panel circuitry
F1-F2-F3, etc. on Large Small Signal Panel: Test points for the frame output circuitry,
S1-S2-S3, etc: Test points for the synchronisation circuitry
V1-V2-V3, etc: Test points for the video processing circuitry
I1-I2-I3, etc: Test points for the Tuner/IF part
A1-A2-A3, etc. on Small Signal Panel: Test points for the audio processing circuitry
A1-A2-A3, etc. on Large Signal Panel: Test points for the audio amplifiers
C1-C2-C3, etc: Test points for the control circuitry
T1-T2-T3, etc: Testpoints for the teletext circuitry
SC1-SC2-SC3, etc: Test points for the Scavem circuitry

The numbering is done in a for diagnostics logical sequence; always start diagnosing within a functional block in the sequence of the relevant test points for that functional block.

5.2 Service modes, Dealer Service Tool and ComPair

For easy installation and diagnosis the dealer remote control RC7150 is introduced. The RC7150 can be used for all new TV sets, including all set of the MG2.1E chassis. The RC7150 is also called Dealer Service Tool or DST. The ordering number of the DST (RC7150) is 4822 218 21232.

Installation features for the dealer

The dealer can use the RC7150 for programming the TV-set with presets.

10 Different program tables can be programmed into the DST via a TV-set (downloading from the GFL , MD2 or MG2.1 to the DST; see GFL, MD2 and MG2.1 service manuals) or by the DST-I (DST interface; ordering code 4822 218 21277).

For explanation of the installation features of the DST, the directions for use of the DST (4822 727 20073) are recommended (For the MG2.1E chassis, download code 4 should be used).

Diagnose features for the servicer

The MG2.1E sets can be put in the two service modes via the DST RC7150. These are the Service Default Mode (SDM) and the Service Alignment Mode (SAM).

The SDM and SAM can also be entered by short circuiting the relevant pins on the SSP.

Service Default Mode (SDM)
Specification of the SDM:

- Tuning frequency 475.25 MHz
- TV-system for BGLM set to BG, for BGLL'I sets to LL'
- All picture settings at 50% (brightness, colour, contrast, HUE)
- All sound settings at 50% except volume at 25% (so bass, treble, balance at 50%, volume at 25%)
- All service-unfriendly modes are disabled (like sleep timer, child lock, blue mute)

Entering the SDM can be done in 2 ways:

- By the "DEFAULT" key on the DST while the set is in the normal operation mode.
- By shortcircuiting for a moment the two pins (pin 2 and 3 of connector 0356) on the component side of the SSP with the indication "SDM" (activation can be performed in all modes except when the set has a problem with the main-processor).

Note: If the SDM is entered via the pins, all the protections are de-activated.

Exiting the SDM can only be done via the STANDBY command. By switching off-on the set with the mains switch the MG2.1E will come up again in the SDM.

Service Alignment Mode (SAM)
Specification of the SAM:

- Software alignments (see chapter 8)
- Option settings (see chapter 8)
- Error buffer reading and erasing. The most recent error code is displayed on the left side.
- Operation counter
- Software version

Entering the SAM can be done in 2 ways:

- By the > button on the DST while the set is in the normal operation mode (or SDM). Enter the password '3-1-4-0' and press OK.
- By shortcircuiting for a moment the two pins (pin 1 and 2 of connector 0356) on the component side of the SSP with the indication "SAM" (activation can be performed in all modes except when the set has a problem with the microprocessor).

Note: If the SAM is entered via the pins, all protections are de-activated.

Exiting the SAM can be done via the MENU command or via switching off-on the set with the mains switch.

Customer Service Mode (CSM)
All MG2.1E sets are equipped with the 'Customer Service Mode' (CSM). This 'Customer Service Mode' (CSM) is a special service mode which can be activated and deactivated by the customer upon request of the service technician/dealer during a telephone conversation in order to identify the status of the set. This CSM is a 'read only' mode, therefore modifications in this mode are not possible.

Switching-on of the Customer Service Mode
The Customer Service Mode will switch-on after pressing simultaneously the "MUTE" knob on the remote control handset and the "MENU" button on the TV for at least 4

seconds. This activation only works if there is no menu on the screen.

Switching-off the Customer Service Mode
The Customer Service Mode will switch-off after pressing any key of the remote control handset (with exception of the 'cursor-up' and 'cursor-down' keys, or the buttons on the TV or by switching off the TV set with the mains switch.

Detailed explanation of the Customer service Mode
After switching on the Customer Service Menu the following screen will appear:

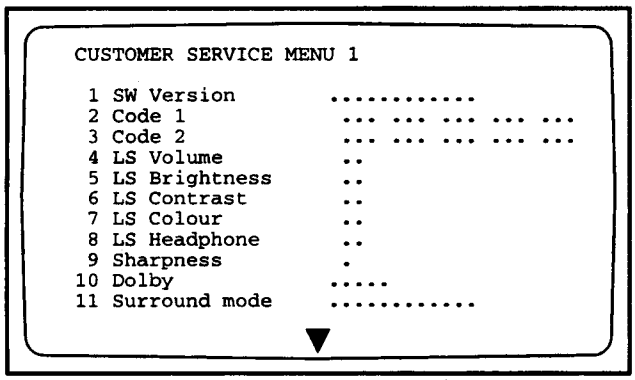
CUSTOMER SERVICE MENU 1
1 SW Version .....
2 Code 1 ... ...
3 Code 2 ... ...
4 LS Volume ..
5 LS Brightness ..
6 LS Contrast ..
7 LS Colour ..
8 LS Headphone ..
9 Sharpness .
10 Dolby .....
11 Surround mode .....

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Figure 5-1 Customer Service Menu 1

Line 1: Software version; the build in software version AAAA= MG21(chassis name) B = E (Europe) C = 1 (language cluster) X = main version number Y = sub version number Details on the software version can be found in the chapter "Software Survey" of the publication "Product Survey - Colour Television".

Line 2: Code 1; gives the last 5 errors of the error buffer. As soon as the built-in diagnose software has detected an error the buffer is adapted.

Line 3: Code 2; gives the first 5 errors of the error buffer. As soon as the built-in diagnose software has detected an error the buffer is adapted. The last occured error is displayed on the leftmost position of code 2. Each error code is displayed as a 3 digit number. When less than 10 errors occur, the rest of the line(s) is(are) empty. In case of no errors the text "No Errors" is displayed. See paragraph 5.3 of this chapter for a description of the error codes.

Line 4: LS Volume; gives the Last Status of the volume as set by the customer for this selected transmitter. Volume values can be changed via the volume key on the remote control handset.

Line 5: LS Brightness; gives the Last Status of the brightness as set by the customer for this selected transmitter. Brightness values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the red button for picture menu and selecting "brightness".

Line 6: LS Contrast; gives the Last Status of the contrast as set by the customer. The value can vary from 0 (contrast is minimum) to 63 (contrast is maximum). Contrast values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the red button for picture menu and selecting "contrast".

Line 7: LS Colour; gives the Last Status of the colour saturation, as set by the customer. The value can vary from 0 (colour is minimum) to 63 (colour is maximum). Colour values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the red button for picture menu and selecting "colour".

Line 8: LS Headphone; gives the Last Status of the headphone volume, as set by the customer. The value can vary from 0 (volume is minimum) to 63 (volume is maximum). Headphone volume values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the green button for sound menu and selecting "headphone".

Line 9: Sharpness; gives the sharpness value. The value can vary from 0 (sharpness is minimum) to 4 (sharpness is maximum). In case of bad antenna signals a too high value of the sharpness can result in a noisy picture. Sharpness values can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the red button for picture menu and selecting "sharpness".

Line 10: Dolby; indicates whether the received transmitter transmits Dolby sound (present) or not (not present). Attention: The presence of Dolby can only be tested by the software on the Dolby Signalling bit. If a Dolby transmission is therefore received without a Dolby Signalling bit, then this indicator will show "not present" even though such a Dolby transmission is received.

Line 11: Surround Mode; indicates the by the customer selected surround mode. In case the set is a Non-dolby set there will be displayed "0". If it is a Dolby-set then is displayed: "Pro Logic", "Dolby 3 Stereo", "Hall" or "Off". For Dolby-set surround mode can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the green button for sound menu and selecting "Surround settings".

By means of the 'cursor-down' knob on the remote control handset the Customer Service Menu 2 will appear. By means of the 'cursor-up' knob on the remote control handset the Customer Service Menu 1 will appear again.

Customer Service Menu 2 represents following information:

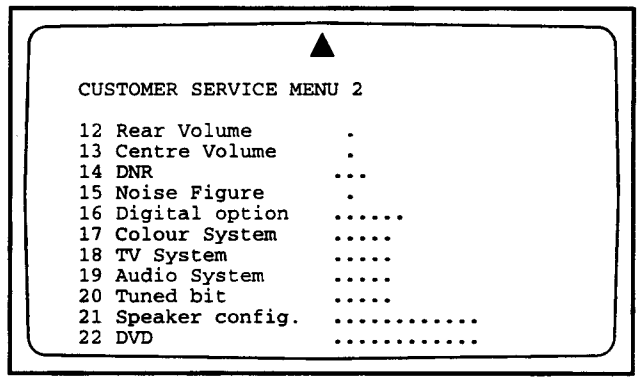

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Figure 5-2 Customer Service Menu 2

Line 12: Rear Volume; gives the volume value of the surround sound loudspeakers. This value can vary from 0 (minimum volume) to 63 (maximum volume). Rear volume can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the green button for sound menu, selecting "Surround settings" and selecting "Rear volume". This feature is only available when surround mode is in "Dolby Pro Logic" or "Hall".

Line 13: Centre Volume; gives the volume value of the centre loudspeakers. This value can vary from 0 (minimum volume) to 63 (maximum volume). Centre volume can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the green button for sound menu, selecting 'Dolby Pro Logic' and selecting "centre volume". This feature is only available when surround mode is in "Dolby Pro Logic" or "Dolby 3 Stereo".

Line 14: DNR (Dynamic Noise Reduction); gives the setting of the DNR for the selected transmitter. The following selections are possible:

"off", "min", "med" or "max"
"off" or "automatic" (MG2.1E with "Automatic Noise Reduction").

The DNR can be changed via the "DNR" key on the remote control handset.

Line 15: Noise Figure; gives the selected noise ratio for this selected transmitter. This value can vary from 0-2 (good signal) to 4-5 (average signal) and to 7 or higher (bad signal). This only works in case the DNR selection is "off/automatic".

Line 16: Digital Option; gives the selected digital mode, "100Hz", Digital Scan" or "Natural Motion". Digital option can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the red button for picture menu and selecting "digital options".

Line 17: Colour System; gives information about the colour system of the selected transmitter.

Black and white:no colour carrier received
PAL:PAL signal received
SECAM:SECAM signal received
NTSC:NTSC signal received

Line 18: TV System; gives information about the video system of the selected transmitter.

- BG:BG signal received
- DK:DK signal received
- I:PAL I signal received
- L:SECAM L signals received
- M38.9:NTSC M signal received with video carrier on 38.9 MHz
- MN:NTSC M signal received

Line 19: Audio System; gives information about the audio system of the selected transmitter.

- Sound Muted:No sound
- Dolby Pro Logic:Dolby Pro Logic sound received
- Mono:Mono sound received
- Stereo:Stereo sound received
- Dual I:Language I received
- Dual II:Language II received
- Digital Mono:Digital mono sound is received
- Digital Stereo:Digital stereo sound is received
- Digital Dual I:Digital language I is received
- Digital Dual II:Digital language II is received

Line 20: Tuned Bit; gives information about the tuning method of the stored preset. If the value is "Yes" the preset is stored via manual entry of the frequency when a transmitter was not present on that frequency. In that case the TV will attempt to perform a micro-search every time the preset number is selected. Once the micro-search has been successful the Tuned Bit will be set to "No".

Line 21: Speaker configuration; gives the configuration setting for the speakers.

In case the set is a Non-dolby set there will be displayed "0". If it is a Dolby-set then is displayed:

"Full internal", "L/R external", "Surround external" or "Full external". For the Dolby-set the speaker configuration can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after opening the installation menu and selecting "set up". The installation menu can be opened by pressing 'timer' and 'enlarge' at the same time. This feature is only available when the set has virtual Dolby.

Line 22: DVD; gives the configuration setting for DVD. This can be "Present" or "Not Present". If "Present" is selected the starting point is a top quality signal and a number of settings are therefore changed automatically. DVD can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after opening the installation menu and selecting "set up". The installation menu can be opened by pressing 'timer' and 'enlarge' at the same time.

Problems and solving tips
The procedures to change the value or the status of the different settings is described in the paragraph 'Detailed explanation of the Customer Service Mode'

Picture problems
Worse picture quality in case of DVD pictures Check line 22 "DVD". In case line 22 gives the indication "Not Present" change the setting into "Present".

Snowy/noisy picture

1. Check line 15 "Noise Figure". In case the value is 7 or higher and the value is also high on other programs check the aerial cable / aerial system.
2. Check lines 9 "Sharpness", 14 "DNR" and 15 "Noise Figure". In case the value of line 9 is 3 or 4 and the value of line 15 is high (7 or higher), lower the value of line 9 "sharpness" and switch DNR (line 14) to "automatic", "on" or to a higher value.

Picture too dark

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, raise the brightness value or raise the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Raise the brightness value or raise the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check lines 6 "PP Brightness" and 7 "PP Contrast". The value of line 6 is low (<10) or the value of line 7 is low (<10). Raise the brightness value or raise the contrast value.

Picture too bright

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer service Mode the picture is OK. Reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
3. Check lines 6 "PP Brightness" and 7 "PP Contrast". The value of line 6 is high(>40) or the value of line 7 is high >50). Reduce the brightness value or raise the contrast value.

Fading picture

Digital scan effect. Check line 14 "DNR". The status of "DNR" is 'med' or 'max'. Reduce "DNR" to 'min' or switch off the digital scan.

White line around picture elements and text

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer service Mode the picture is OK. Reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
3. Check lines Check line 8 "Sharpness". Reduce the sharpness value. The new value(s) are automatically stored for all TV channels

No picture Check line 20 "Tuned bit". In case the value is 'Yes', install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation.

Blue picture No proper signal is received. Check the aerial cable/aerial system.

Blue picture and/or unstable picture A scrambled or decoded signal is received

Black and white picture Check line 5 "PP colour" In case the value is low (<10) raise the value of colour. The new value(s) are automatically stored for all TV channels.

No colours/colour lines around picture elements

1. Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'PAL' and line 18 is 'M 38,9', the installed system for this preset is 'USA', while 'West Europe' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'.
2. In case line 17 is 'PAL' and line 18 is 'L', the installed system for this preset is 'France', while 'West Europe' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'

No colours/noise in picture

1. Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'Black and White' and line 18 is 'BG', the installed system for this preset is 'West Europe', while 'USA' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; USA'.
2. In case line 17 is 'Black and White' and line 18 is 'L', the installed system for this preset is 'France', while 'USA' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; USA'

Colours not correct Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'PAL' and line 18 is 'L', the installed system for this preset is 'France', while 'West Europe' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; West Europe'.

Colours not correct/unstable picture Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'SECAM' and line 18 is 'BG', the installed system for this preset is 'USA', while 'France' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; France'.

Unstable picture Check lines 17 "Colour System" and 18 "TV System". In case line 17 is 'SECAM' and line 18 is 'M 38,9', the installed system for this preset is 'West Europe', while 'France' is required. Install the required program again. Open the installation menu by pressing 'timer' and 'enlarge' at the same time and perform manual installation. Select 'System; France'.

Menu text not sharp enough

1. Press "Smart Picture" button on the Remote Control handset. In case picture improves, reduce the contrast value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the picture is OK. Reduce the contrast value The new value(s) are automatically stored for all TV channels.
3. Check line 7 "PP Contrast". The value of line 7 is high (>50). Reduce the contrast value.

Sound problems

No sound from left and right speaker

1. Press "Smart Sound" button on the Remote Control handset. In case sound improves, raise the volume value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the volume is OK. Raise the volume value. The new value(s) are automatically stored for all TV channels.
3. Check line 4 "PP Volume". The value is low. Raise the value of "PP Volume". The new value(s) are automatically stored for all TV channels.

Sound too loud for left and right speaker

1. Press "Smart Sound" button on the Remote Control handset. In case sound improves, reduce the volume value. The new value(s) are automatically stored for all TV channels.
2. After switching on the Customer Service Mode the volume is OK. Reduce the volume value. The new value(s) are automatically stored for all TV channels.
3. Check line 4 "PP Volume". The value is high. Reduce the value of "PP Volume". The new value(s) are automatically stored for all TV channels.

No sound from "centre" speaker Check line 12 "Centre Volume" The value is low. Raise the value of the "Centre Volume"

Sound too loud from "centre" speaker Check line 12 "Centre Volume" The value is high. Reduce the value of the "Centre Volume"

Diagnose Mode (only active during transmission of error codes and diagnose 99)

This mode is activated by the DIAGNOSE command on the DST for reading the error codes and erasing the error buffer by the DST even when the set is in protection and so there is no picture (assuming that the power supply and the control part are working). For activation see paragraph 5.3. The diagnose Mode is only a temporarily mode (the set will go back to the previous mode), and can not be switched on permanently.

Note: The diagnose mode can not be entered if the SAM is activated.

Compair
Compair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. Compair is a further development on the DST service remote control allowing faster and more accurate diagnostics. Compair has three big advantages:

Compair helps you to quickly get an understanding how to repair the MG2.1E in short time by guiding you step by step through the repair procedures
Compair allows very detailed diagnostics (on I^2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I^2C commands yourself; Compair takes care of this
Compair speeds up the repair time since it can automatically communicate with the MG2.1E (when the micro processor is working) and all repair information is directly available. When Compair is installed together with the SearchMan MG2.1E electronic manual, schematics and PCBs are only a mouse-click away

Compair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The Compair interface box is connected to the PC via a serial or RS232 cable. In case of the MG2.1E chassis, the Compair interface box and the television communicate with each other via bi-directional infrared signal.

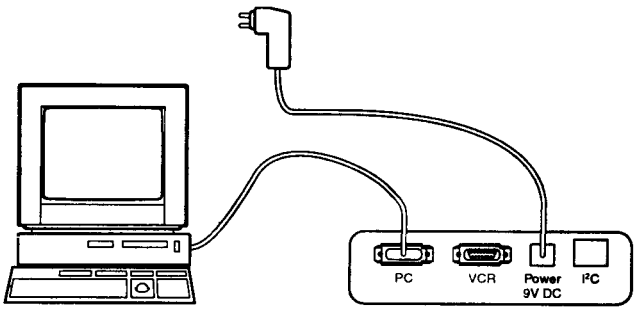


Figure 5-3

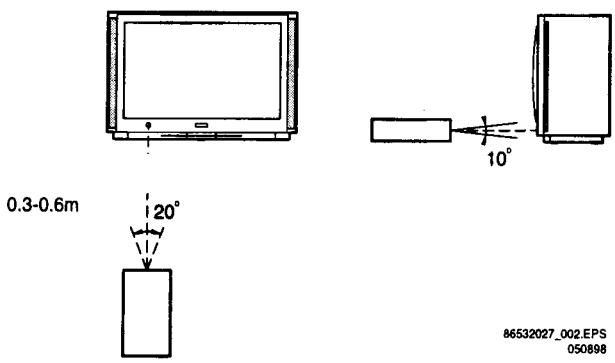


Figure 5-4

The Compair fault finding program is able to determine the problem of the defective television. Compair can gather diagnostic information in 2 ways:

1. communication to the television (automatic)
2. asking questions to you (manually)

Compair combines this information with the repair information in its database to find out how to repair the MG2.1E.

Automatic information gathering
Step-by-step start up Under normal circumstances, a fault in the power supply or an error during start-up will switch the television to protection-mode. Compair can take over the initialisation of the television. In this way it is possible to distinguish which part of the start-up routine (hence which circuitry) is causing the problem.

Reading out the error buffer Compair can automatically read out the contents of the entire error buffer.

Diagnosis on I^2C level. Compair can access the I^2C bus of the televsion without a physical connection. Compair can send and receive infrared commands to the micro controller of the television. These commands are translated by the controller to I^2C commands and vice versa. In this way it is possible for Compair to communicate (read and write) to devices on the I^2C busses of the MG2.1E.

Manual information gathering
Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extend. When this is not the case, Compair will guide you through the fault finding tree by asking you questions and showing you examples. You can answer by clicking on a link (e.g. text or an oscillogram) that will bring you to the next step in the fault findig process.

A question could be: Do you see snow? (Click on the correct answer)

YES / NO

An example can be: Measure testpoint I7 and click on the correct oscillogram you see on the oscilloscope

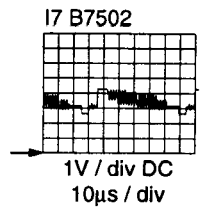


Figure 5-5

By a combination of automatic diagnostics and an interactive question/answer procedure, Compair will enable you to find most problems in a fast and effective way.

Additional features
Beside fault finding, Compair provides some additional features like:

Uploading / downloading of presets
Managing of preset lists
Emulation of the Dealer Service Tool

SearchMan (electronic service manual)
When Compair is installed in combination with SearchMan, all schematics and PCBs will be directly available while you repair a television if you click on a PCB or schematic link:

Example: Measure the DC voltage on C2568 (PCB / schematic) on the small signal level..

Clicking on PCB will automatically pop-up a picture of the PCB with the location of C2568 marked. Clicking on schematic will automatically pop-up the schematic with the location of C2568 marked.

5.3 Error codes

5.3.1 *Reading error codes from the error buffer*

The error buffer can be read in 2 ways:

1. On the screen via the Service Alignment Mode (SAM) In case picture is OK, the error buffer can be read the easiest via the SAM. In the main menu of the SAM the last 10 different error codes occurred are displayed. The most recent detected error code is displayed on the left side, so e.g.: 0 0 0 0 0means no error codes present in the buffer 3 0 0 0 0means one error code present in the buffer; error code 3 2 3 0 0 0 means two error codes present in the buffer; error code 2 is the most recent, error code 3 is detected before 2
2. On the display of the DST If an error has been detected by the MG2.1E chassis, the set might go into protection. Without the presence of a picture the errors can be read by the DST, as long as the main-processor is still active (green LED continuous and red LED blinking fast (5Hz); in case of red LED is blinking slow (1,25Hz) there is a main-processor problem). To transmit the errors from the TV to the DST:
   1. Press the "DIAGNOSE" key (in all modes except the SAM)
   2. Press "1" to view the last error detected.
   3. Hold the DST 5 to 10 cm from in front of the stand-by LED of the set (the IR-sending LED of MG2.1E is located near the stand-by LED).
   4. Press the "OK" key.

The error is represented by a 2 digit number. The 2 digits on the DST are displayed sequentially, with a pause before it is repeated. The digit after the pause is the 1st digit. If the display reads 4 - 7, the error code is 47. To read other error codes, press "DIAGNOSE" and one of the other digit keys. Note:

- If the DST cannot communicate to the MG2.1E in a proper way, ERROR 2 is shown in the display of the DST. Trying again by changing the DST position a little bit might often help.
- If the error buffer of MG2.1E is empty, no errors are displayed by the DST; the display remains blank.

5.3.2 *Clearing the error buffer*

The error buffer can be cleared in 2 ways:

1. In the SAM by selecting the item RESET ERROR BUFFER in the main menu.
2. By the "DIAGNOSE 99" command of the DST (in all modes except the SAM). Press the DIAGNOSE key on the DST, followed by 9 and 9 and then >.

5.3.3 *Error code table*

Table 5-1 Error messages

Error	Device	Description	item	Diagram	Defective module indication
1	ST24E16	Non volatile memory	IC7008	K7	Control
2	ST24E32 or M24C32	Non volatile memory	IC7008	K7	
3	SAA5800	OTC2.5 microprocessor/TXT	IC7003	K7	
5	UV1316	Tuner	U1102	K1	Tuner
15	TDA9320H	HIP I/O-video processing	IC7501	K1	Chroma IF IO
20	TDA9330H	HOP video control/deflection processor	IC7300	K6	Video Controller
25	MSP3410D	ITT sound processor	IC7751	K3	Audio module
26	SAA7712H	SEDSP dolby processor	IC7770	K4	
50	SAA4978H	Picnic	IC7609	K5	Feature Box
51	SAA4990H	Prozonic	IC7608	K5	
65	Slow I^2C		fig 5.7		Slow I^2C
66	Fast I^2C		fig 5.7		Fast I^2C
67	Supply 5V	5V2	fig 5.6		+5 V Supply
68	Supply 8V	8V6	fig 5.8		+8V Supply
20	V fail protection	VFB	fig 5.9	A3/A2/K6	Vertical Flyback
71	H fail protection	HFB	fig 5.9	A2/K6	Horizontal Flyback
73	Line Deflection protection	LDP	IC7484	A2/K6	Line Deflection
74	Beam Current Protection	BC-PROT	TS7351	K6/K7	Beam Current
76	DC Sound protection	DC-PROT	TS7762	A4/A1	Sound Output
77	Feature box protection	FBX-PROT	fig 5.5	K4	+3V3 (FBX) Supply

Remark: If on the DST the text "ERROR 2" is displayed, this means that the communication from the TV to the DST has failed

5.4 Protections

5.4.1 General

The MG2.1E "Protection Diagram" shows the structure of the protection system. See protection diagram (fig 5.6)

One micro-processor.

The MG2.1E has only one micro-processor (OTC) and it remains active during Standby. This because power of the uP and the attached memory chip set is coming from the 3V3 supply, which is derived from the 5V Standby-circuitry. So in both power-on as in Standby-mode the uP is connected to this power supply. The micro processor controls the Standby-line for switching on and off the main supply. In the standby-mode or in the protection-mode the Standby-line will open the contacts of relay 1002 via T7000 and T7001, this results in switching off the mains input to the main supply (FFS). In the mean time via T7550 the intensity of LED of the opto-coupler will increase, which results in a quick slow-down of the FFS supply.

Two service-modes

To get a quick diagnoses the MG2.1E has two service-modes implemented:

The service default mode. Start-up of the set in a predefined way.
The service alignment mode. In this mode items of the set can be adjusted via a menu and with the help of test patterns.

Both modes can be entered via the service connector on the SSP (connector 0356) or via the DST (dealer service tool) or via Compair. The service alignment mode can not be entered in Standby, the set has to be in normal operation.

Protection levels

If a fault situation is detected an error code will be generated and if necessary the set will be put in the protection-mode. The protection-mode is indicated by blinking of the red LED. In some error cases the micro processor does not put the set in the protection-mode. The error codes of the error buffer can be read via the service-menu (SAM) or via the service send-LED and the DST/ Compair . The DST diagnose functionality will force the set in to the Service-standby, which is alike the usual Standby, however the micro-processor has to remain in normal operation completely.

The protections of the MG2.1E can be divided in 4 groups

- Protection from I^2C-busses (Fast and Slow) or I^2C-IC errors (device errors)
- Protection from the inputs on the OTC
- Protections from the status register of the HOP (communicated via I^2C-bus)
- DC-protection (sound amplifiers) monitored on OTC

5.4.2 Protection from the I^2C bus (fig. 5.7)

In normal operation some registers of the I^2C controlled ICs will be refreshed every 200 msec. During this sequence three I^2C-busses and the I^2C -ICs as well will be checked. The I^2C protection will take place if the SDA and SCL are whether short circuited to ground or to each other. An I^2C error can also occur, if the power supply of the IC is missing.

Protection from the inputs on the OTC (fig.5.8)

If a protection is detected at an input of the OTC, all protection inputs of the OTC will be scanned every 200 msec. for 5 times. If the protection on one of the inputs is still activated after 1 sec., then the set will be put in the protection-mode. Before the scanning is started a so called ESD-refresh will be carried out first, because the interrupt on one of the inputs may be caused either by a FLASH or by ESD. As a FLASH or ESD can harm the settings of some ICs, the HOP-HIP-ITT-EDRIC (Dolby-IC)-TEA6417-TEA6422-LTP-PICNIC and Tuner are initialised again to ensure the normal picture and sound conditions of the set.

- 8V6 and 5V2 protection. (See detailed figure 5.8)
- The presence of the 8V6 and 5V2 is sensed by the OTC. If the 8V6 and 5V2 is not present, then an error code is stored in the error buffer and the set is put in the protection-mode.
- BC protection (Beam Current). (See detailed figure 5.8)
- The beam current is measured by a circuit on the SSP. If the beam current exceeds a certain reference level, then via D6350 and T7351 the BC-input of the OTC is set to high. The error code is stored in the error buffer and the set is put in the protection-mode.
- LDP-protection (Line Deflection Protection) (See detailed figure 5.8)
- Two protection circuits are connected to the LDP-input of the HOP :
  1. Flash detection. From the EHT-info, via D6341 and T7341 a flash will stop the H-drive and line output stage immediately. The FLS-bit in the status register of the HOP is set to 'high'. As the duration of a flash is very short the FLS-bit will be reset to 'low' again after the flash refresh, so via a slow start the set will be started again.
  2. LDP detection. The EW-protection, coming from the line-output is also connected to the same input as above. The current through the EW-stage is measured by R3483 and R3484 on the LSP. The voltage across these precision resistors will increase in case of a failure at the line output stage. If the voltage becomes higher than 1 V, then the output of IC7484 will become 'high' and remains 'high' via D6485 and R3490. Via D6344 the H-drive will be stopped. The FLS-bit will be set to 'high' and remains 'high' by means of the software filtering even after a flash refresh. The OTC will put the set Standby-mode. The error code is stored in the error buffer and the set gets into the protection mode.

5.4.4 Protections from the status register of the HOP (fig. 5.9)

Every 200 msec. the status register of the HOP is read by the OTC via I^2C. If a protection signal is detected on one of the inputs of the HOP, then the relevant error bit in the HOP register is set to 'high'. If the error bit is still 'high' after 1 sec., the OTC will store the error code in the error buffer and depending on the relevancy of the error bit the set will either go into the protection-mode or not.

HFB : Horizontal Flyback (See detailed figure 5.9) Missing the horizontal fly back pulse is detected via an input of the HOP. One status bit is set to 'high'. The error code is stored in the error buffer and the set will go into the protection mode
VFB : Vertical Flyback (See detailed figure 5.9) The HOP will blank the screen , if the vertical flyback signals are not present at the VFB-guard input .The relevant status bit will

be set in the register of the HOP. The error code is stored in the error buffer, in this case protection is not necessary.

5.4.5 DC-protection, sound amplifiers (Fig. 5.10)

This is an urgent protection, the circuitry is located at the LSP. The output of the protection circuit will slow-down the FFS power supply immediately via the opto-coupler and via the Standby-relay the supply will be switched into Standby-mode at once. To be able to store the error code in the error buffer the protection signals are also wired to the OTC.

The protection is activated in case of

unbalance of +Vs and -Vs
unbalance of +7V7 and -7V7
DC output present on one of the audio amplifiers

5.5 Fault find trees

See fault find trees at the end of this chapter. (figures 5.11-5.17)

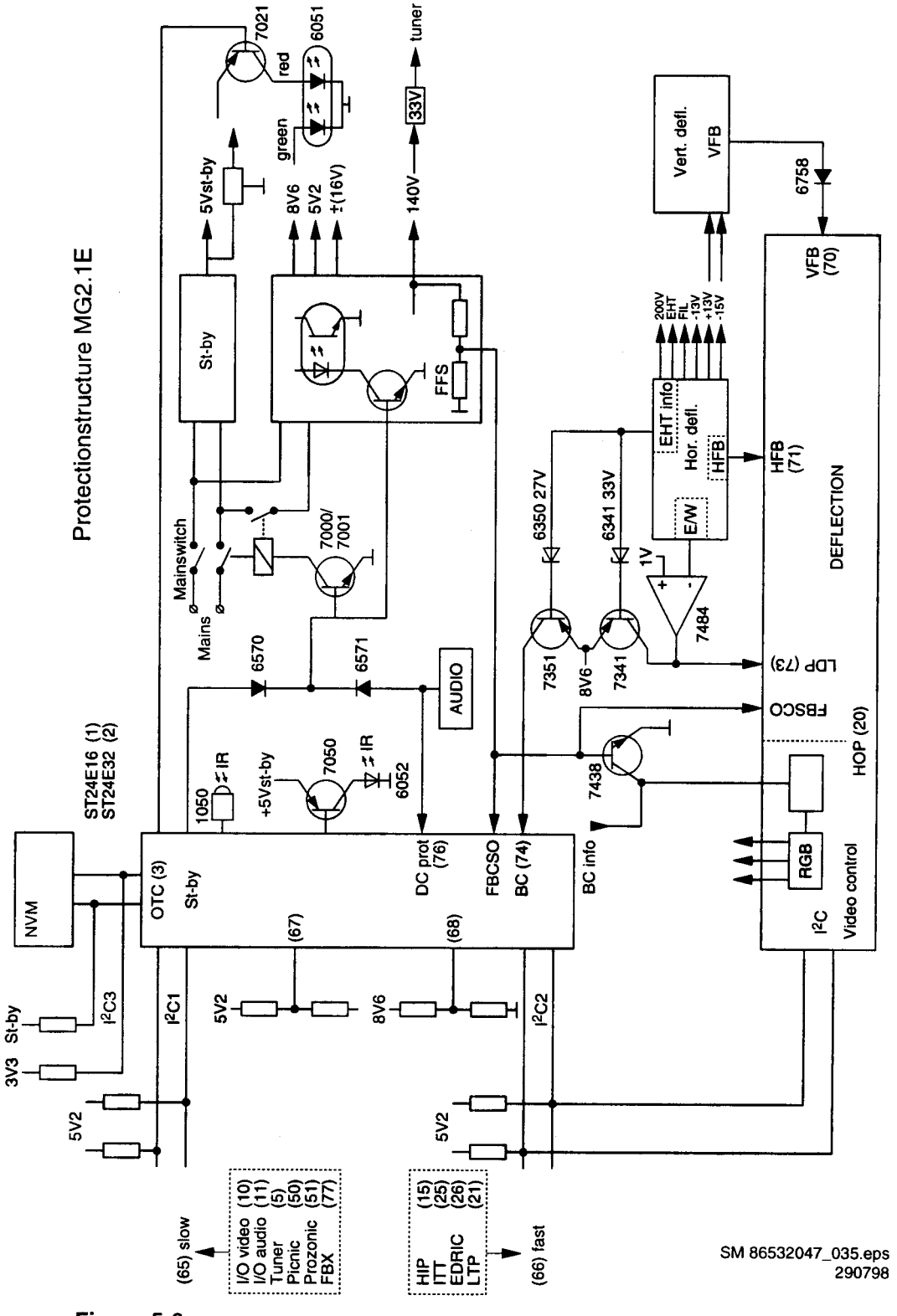
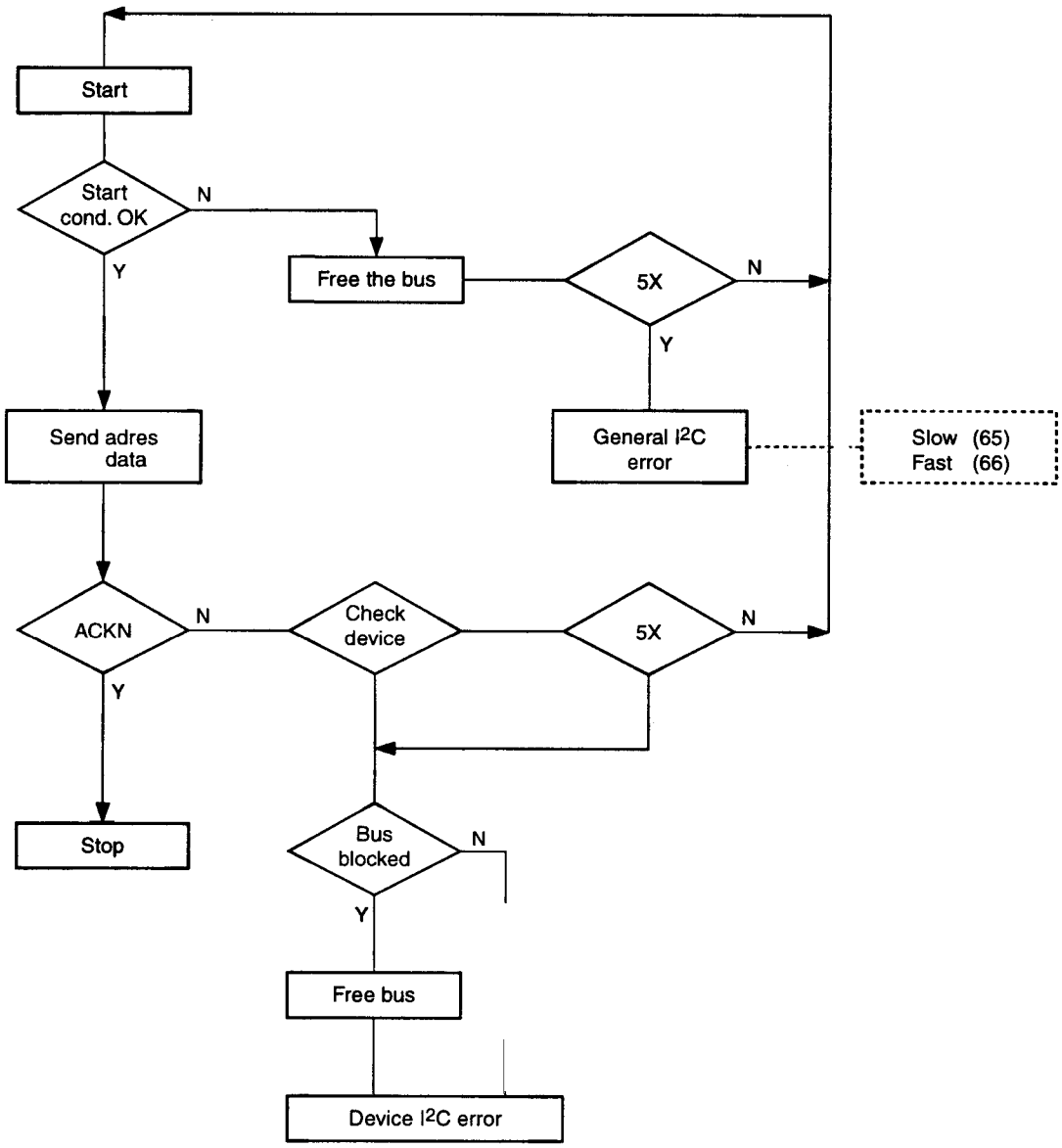

Protectionstructure MG2.1E
7021
6051
red
green
tuner
33V
5Vst-by
8V6
5V2
±(16V)
140V
St-by
FFS
Mainswitch
Mains
7000/
7001
6570
6571
AUDIO
1050
IR
+5Vst-by
7050
6052
ST24E16 (1)
ST24E32 (2)
NVM
OTC (3)
St-by
DC prot (76)
FBCSO
BC (74)
BC info
(67)
(68)
I²C1
I²C2
I²C3
3V3
St-by
5V2
8V6
Vert. defl.
VFB
6758
VFB (70)
200V
EHT
FIL
-13V
+13V
-15V
EHT info
Hor. defl.
HFB
E/W
HFB (71)
DEFLECTION
6350 27V
6341 33V
1V
7484
7351
7341
LDP (73)
FBSCO
HOP (20)
7438
RGB
I²C
Video control
(65) slow
I/O video (10)
I/O audio (11)
Tuner (5)
Picnic (50)
Prozonic (51)
FBX (77)
HIP (15)
ITT (25)
EDRIC (26)
LTP (21)
(66) fast
SM 86532047_035.eps
290798

Figure 5-6

I²C drivers



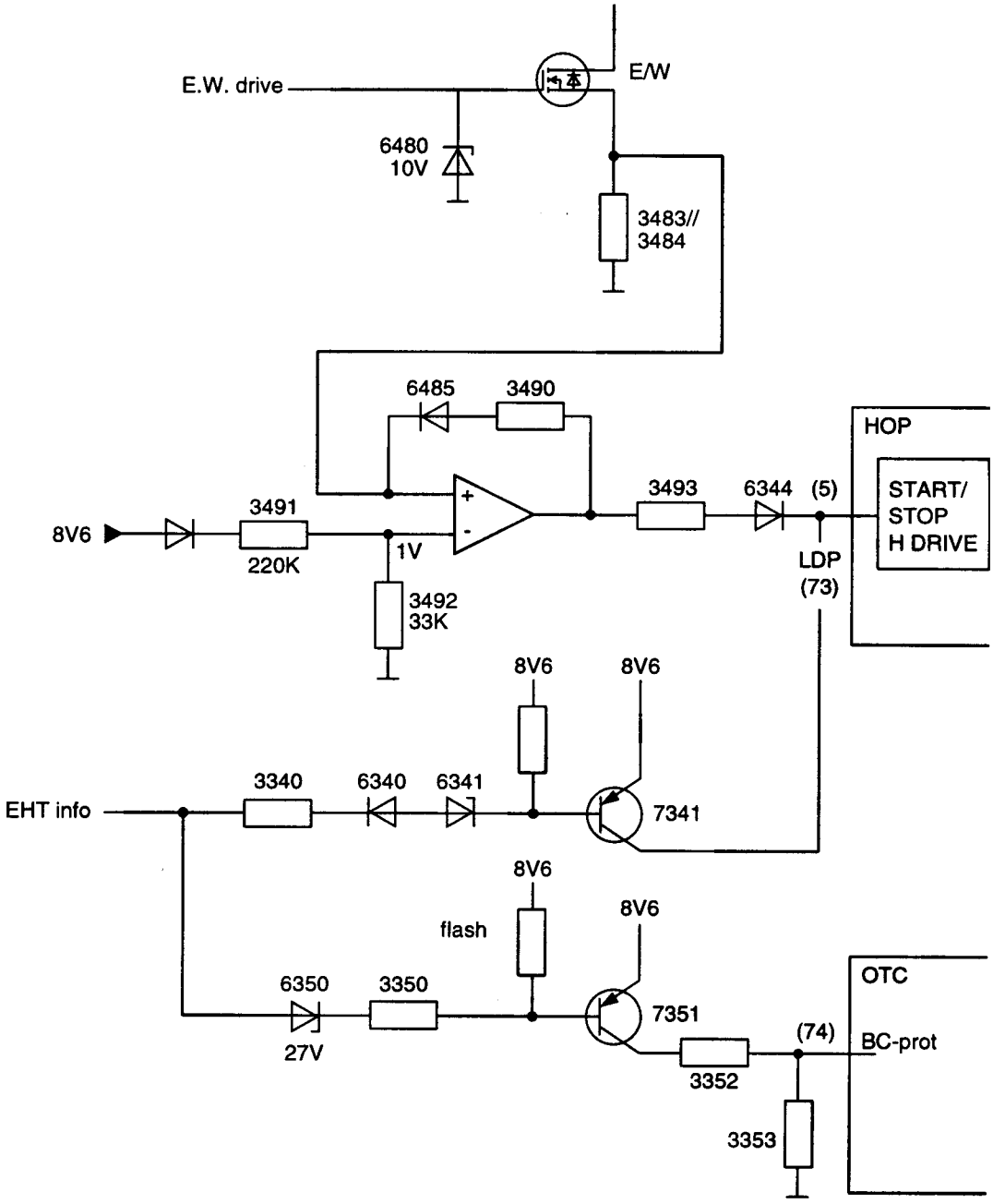
Slow	
TEA 6422	(11)
Tuner	(5)
Picnic	(50)
Prozonic	(51)
I/O video	(10)
FBX PROT	(77)

Fast	
LTP	(21)
Dolby	(26)
ITT	(25)
HIP	(15)
HOP	(20)

NVM-bus	
NVM	(1)
	(2)

SM 86532047_036.eps
290798

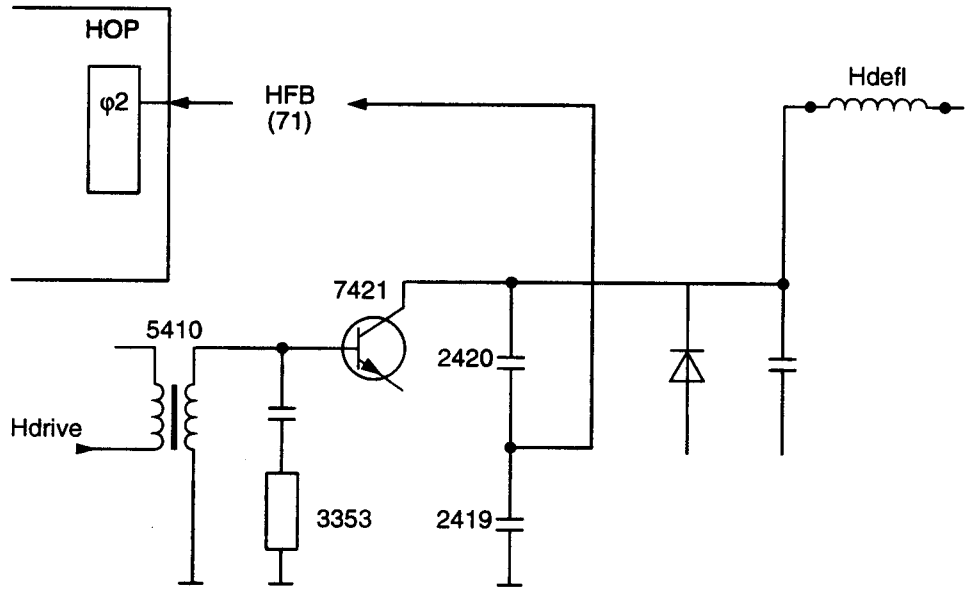
Figure 5-7



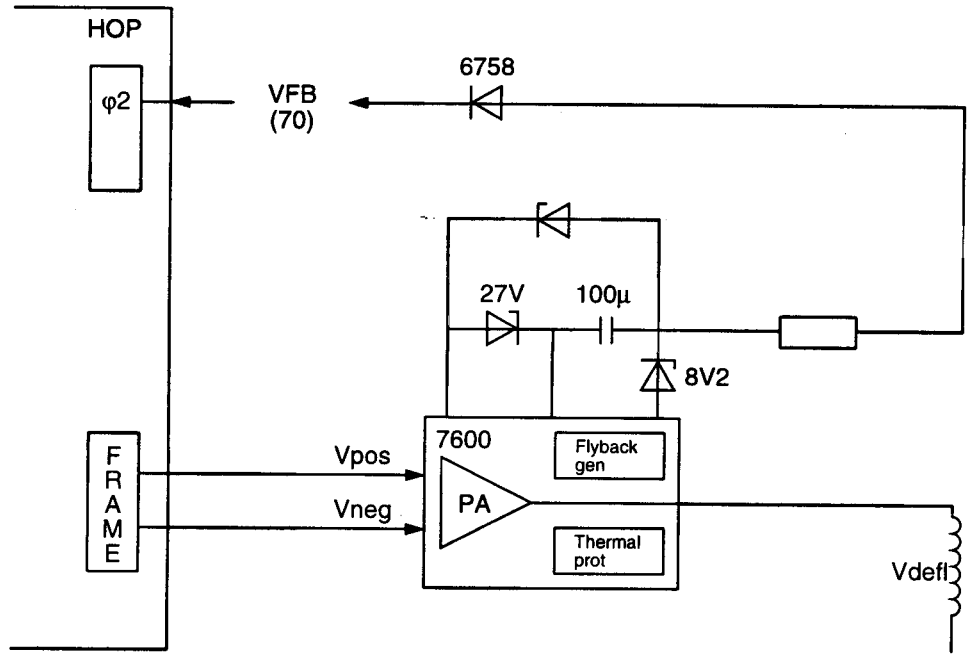
SM 86532047_038.eps
290798

Figure 5-8

HFB horizontal fly-back



VFB vertical fly-back



290798

Figure 5-9

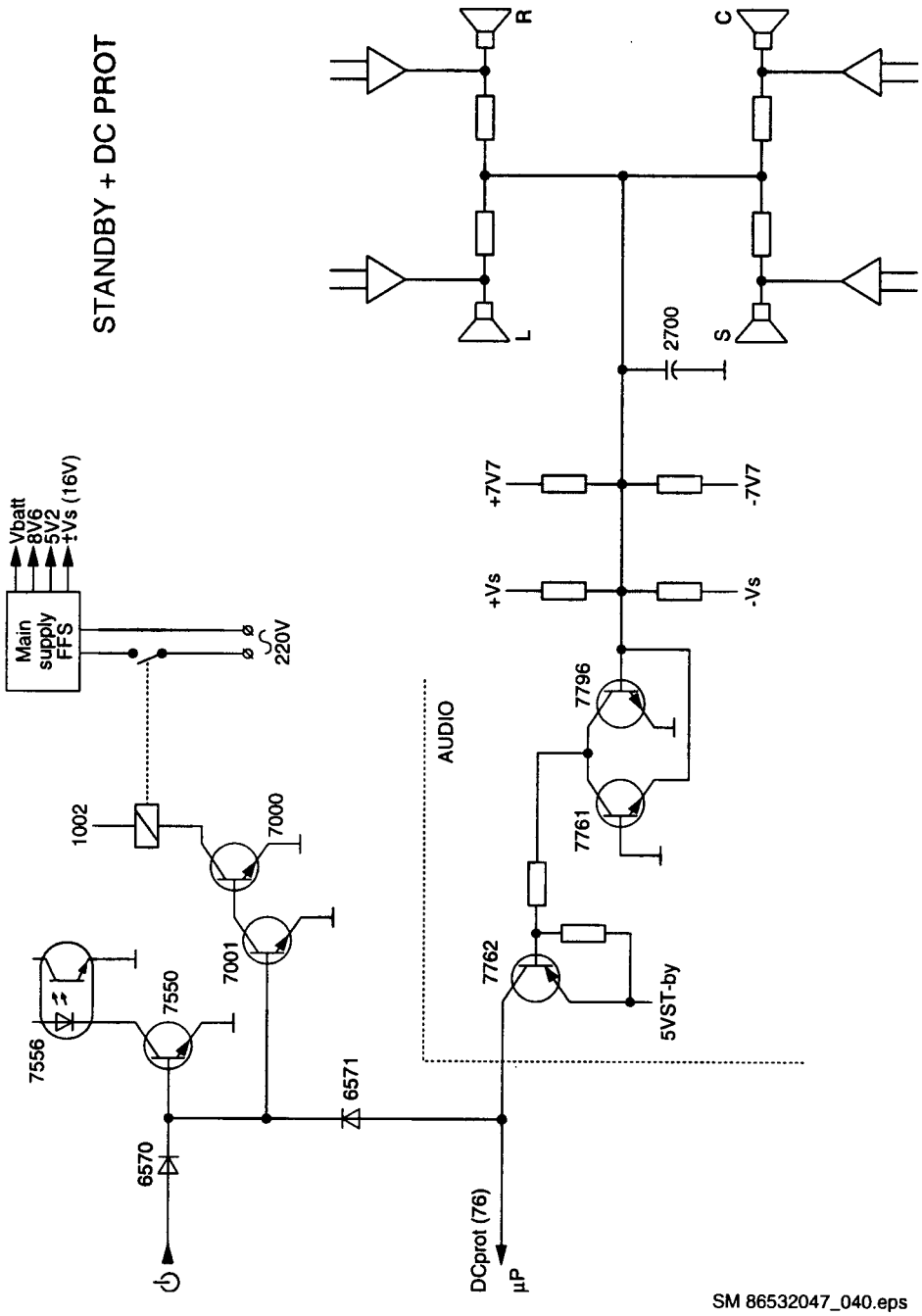
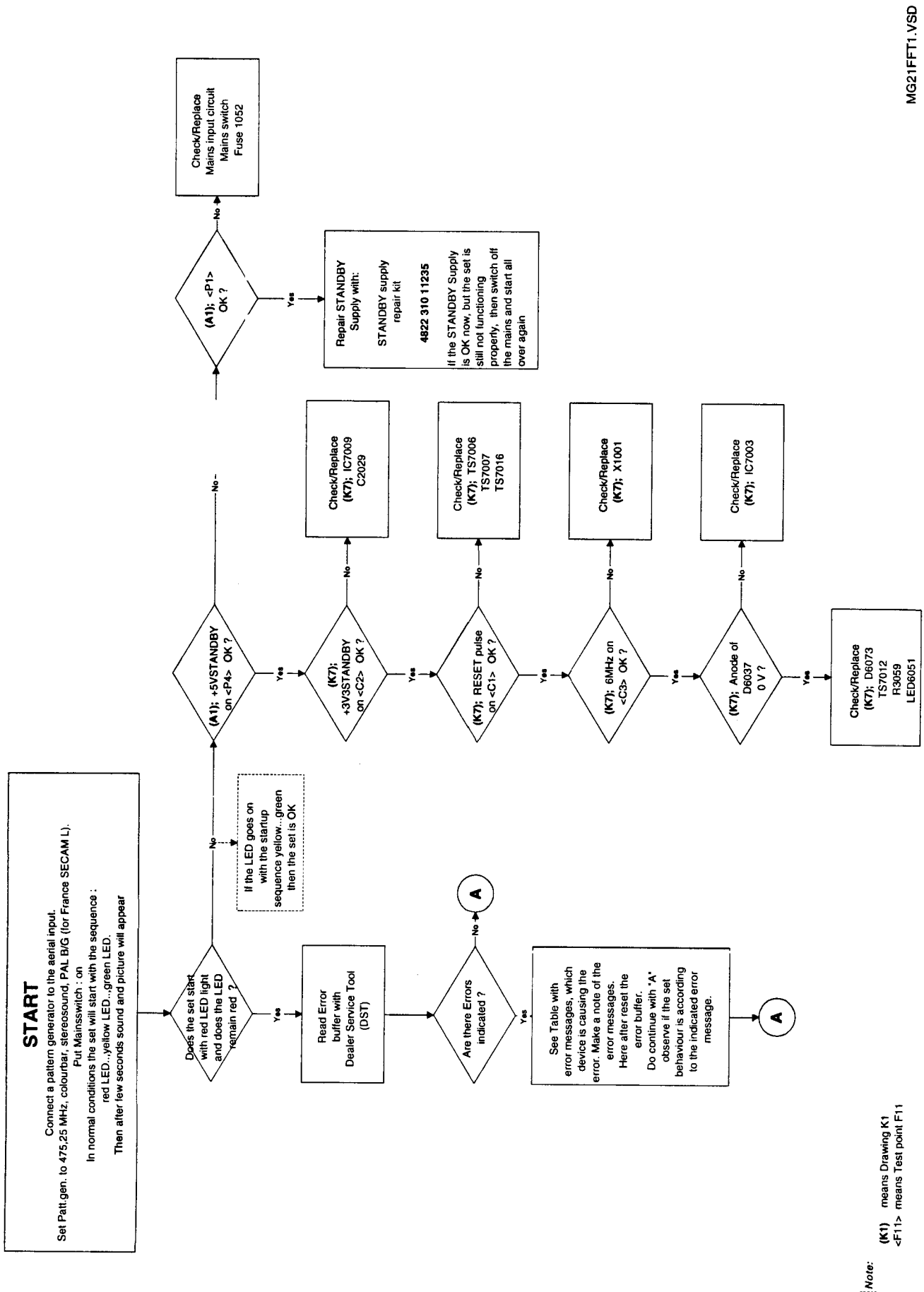

STANDBY + DC PROT
R
C
L
S
2700
+7V7
-7V7
+Vs
-Vs
Vbatt
8V6
5V2
+Vs (16V)
Main supply FFS
220V
1002
7000
7001
7550
7556
7796
7761
7762
AUDIO
5VST-by
6571
6570
DCprot (76)
µP
SM 86532047_040.eps
290798

Figure 5-10


START
Connect a pattern generator to the aerial input.
Set Patt.gen. to 475,25 MHz, colourbar, stereosound, PAL B/G (for France SECAM L).
Put Mainsswitch : on
In normal conditions the set will start with the sequence :
red LED...yellow LED...green LED.
Then after few seconds sound and picture will appear
Does the set start with red LED light and does the LED remain red ?
Yes
No
If the LED goes on with the startup sequence yellow...green then the set is OK
Read Error buffer with Dealer Service Tool (DST)
Are there Errors indicated ?
Yes
No
A
See Table with error messages, which device is causing the error. Make a note of the error messages. Here after reset the error buffer. Do continue with "A" observe if the set behaviour is according to the indicated error message.
A
(A1); +5VSTANDBY on <P4> OK ?
Yes
No
Check/Replace Mains input circuit Mains switch Fuse 1052
(A1); <P1> OK ?
Yes
No
Repair STANDBY Supply with:
STANDBY supply repair kit
4822 310 11235
If the STANDBY Supply is OK now, but the set is still not functioning properly, then switch off the mains and start all over again
(K7); +3V3STANDBY on <C2> OK ?
Yes
No
Check/Replace (K7); IC7009 C2029
(K7); RESET pulse on <C1> OK ?
Yes
No
Check/Replace (K7); TS7006 TS7007 TS7016
(K7); 6MHz on <C3> OK ?
Yes
No
Check/Replace (K7); X1001
(K7); Anode of D6037 0 V ?
Yes
No
Check/Replace (K7); IC7003
Check/Replace (K7); D6073 TS7012 R3059 LED6051
MG21FT1.VSD

Note: (K1) means Drawing K1
<F11> means Test point F11

Figure 5-11

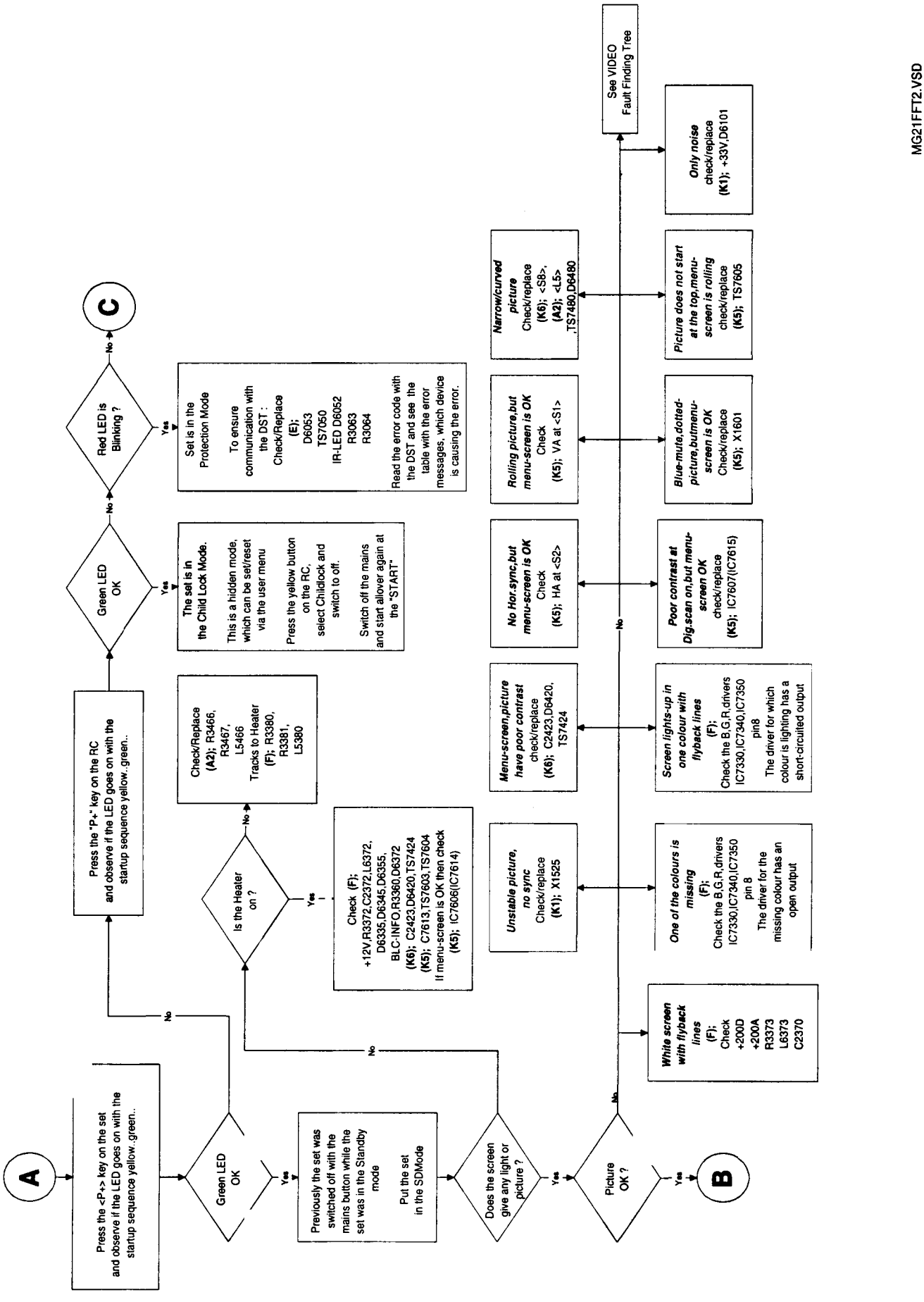
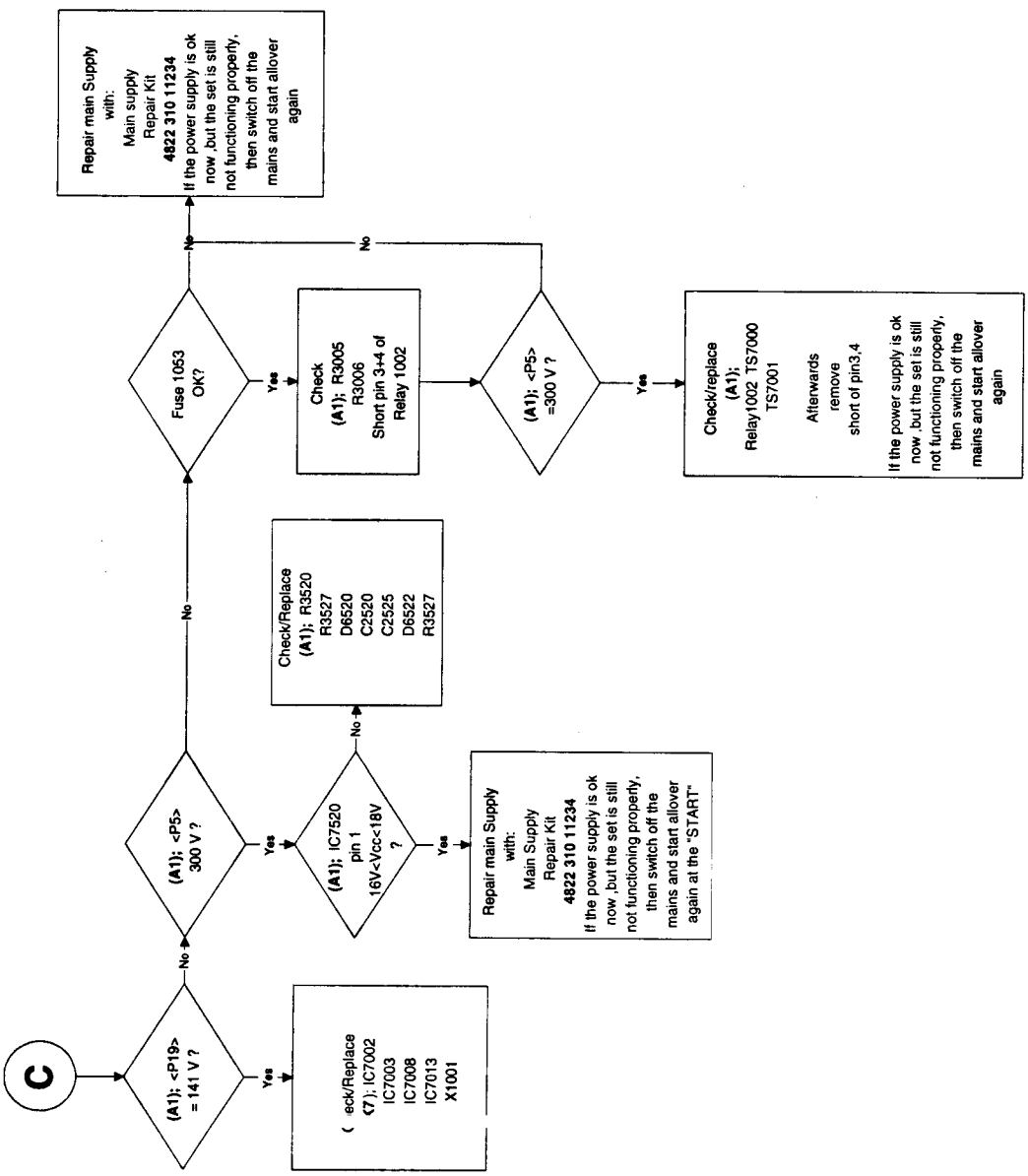

A
Press the <P+> key on the set and observe if the LED goes on with the startup sequence yellow..green..
Green LED OK
No
Yes
Press the "P+" key on the RC and observe if the LED goes on with the startup sequence yellow..green..
Green LED OK
No
Yes
The set is in the Child Lock Mode.
This is a hidden mode, which can be set/reset via the user menu
Press the yellow button on the RC, select Childlock and switch to off.
Switch off the mains and start allover again at the "START"
Red LED is Blinking ?
No
Yes
Set is in the Protection Mode
To ensure communication with the DST : Check/Replace (E); D6053 TS7050 IR-LED D6052 R3063 R3064
Read the error code with the DST and see the table with the error messages, which device is causing the error.
C
Previously the set was switched off with the mains button while the set was in the Standby mode
Put the set in the SDMode
Is the Heater on ?
No
Yes
Check/Replace (A2); R3466, R3467, L5466 Tracks to Heater (F); R3380, R3381, L5380
Check (F); +12V,R3372,C2372,L6372, D6335,D6345,D6355, BLC-INFO,R3360,D6372 (K6); C2423,D6420,TS7424 (K5); C7613,TS7603,TS7604 If menu-screen is OK then check (K5); IC7606(IC7614)
Does the screen give any light or picture ?
No
Yes
Unstable picture, no sync Check/replace (K1); X1525
Menu-screen,picture have poor contrast check/replace (K6); C2423,D6420, TS7424
No Hor.sync,but menu-screen is OK Check (K5); HA at <S2>
Rolling picture,but menu-screen is OK Check (K5); VA at <S1>
Narrow/curved picture Check/replace (K6); <S8>, (A2); <L5> ,TS7480,D6480
Picture OK ?
No
Yes
One of the colours is missing (F); Check the B,G,R,drivers IC7330,IC7340,IC7350 pin 8 The driver for which missing colour has an open output
Screen lights-up in one colour with flyback lines (F); Check the B,G,R,drivers IC7330,IC7340,IC7350 pin8 The driver for which colour is lighting has a short-circuited output
Poor contrast at Dig.scan on,but menu-screen OK check/replace (K5); IC7607(IC7615)
Blue-mute,dotted-picture,butmenu-screen is OK Check/replace (K5); X1601
Picture does not start at the top,menu-screen is rolling check/replace (K5); TS7605
See VIDEO Fault Finding Tree
White screen with flyback lines (F); Check +200D +200A R3373 L6373 C2370
Only noise check/replace (K1); +33V,D6101
B
MG21FFT2.VSD

Figure 5-12



MG21FFT3.VSD

Figure 5-13

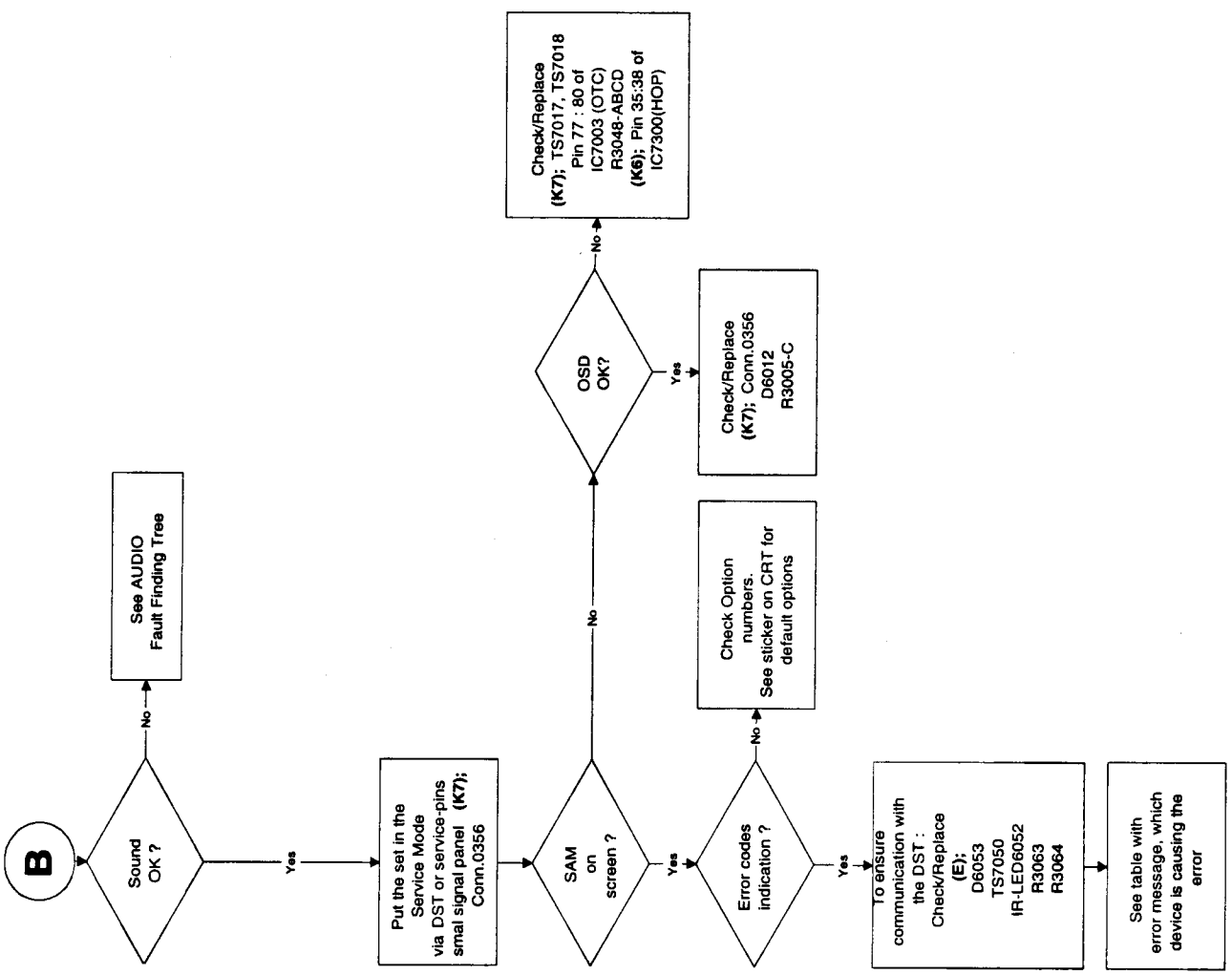

B
Sound OK ?
No
See AUDIO Fault Finding Tree
Yes
Put the set in the Service Mode via DST or service-pins smal signal panel (K7); Conn.0356
SAM on screen ?
No
OSD OK?
No
Check/Replace (K7); TS7017, TS7018 Pin 77 : 80 of IC7003 (OTC) R3048-ABCD (K6); Pin 35:38 of IC7300(HOP)
Yes
Check/Replace (K7); Conn.0356 D6012 R3005-C
Yes
Error codes indication ?
No
Check Option numbers. See sticker on CRT for default options
Yes
To ensure communication with the DST : Check/Replace (E); D6053 TS7050 IR-LED6052 R3063 R3064
See table with error message, which device is causing the error

Figure 5-14

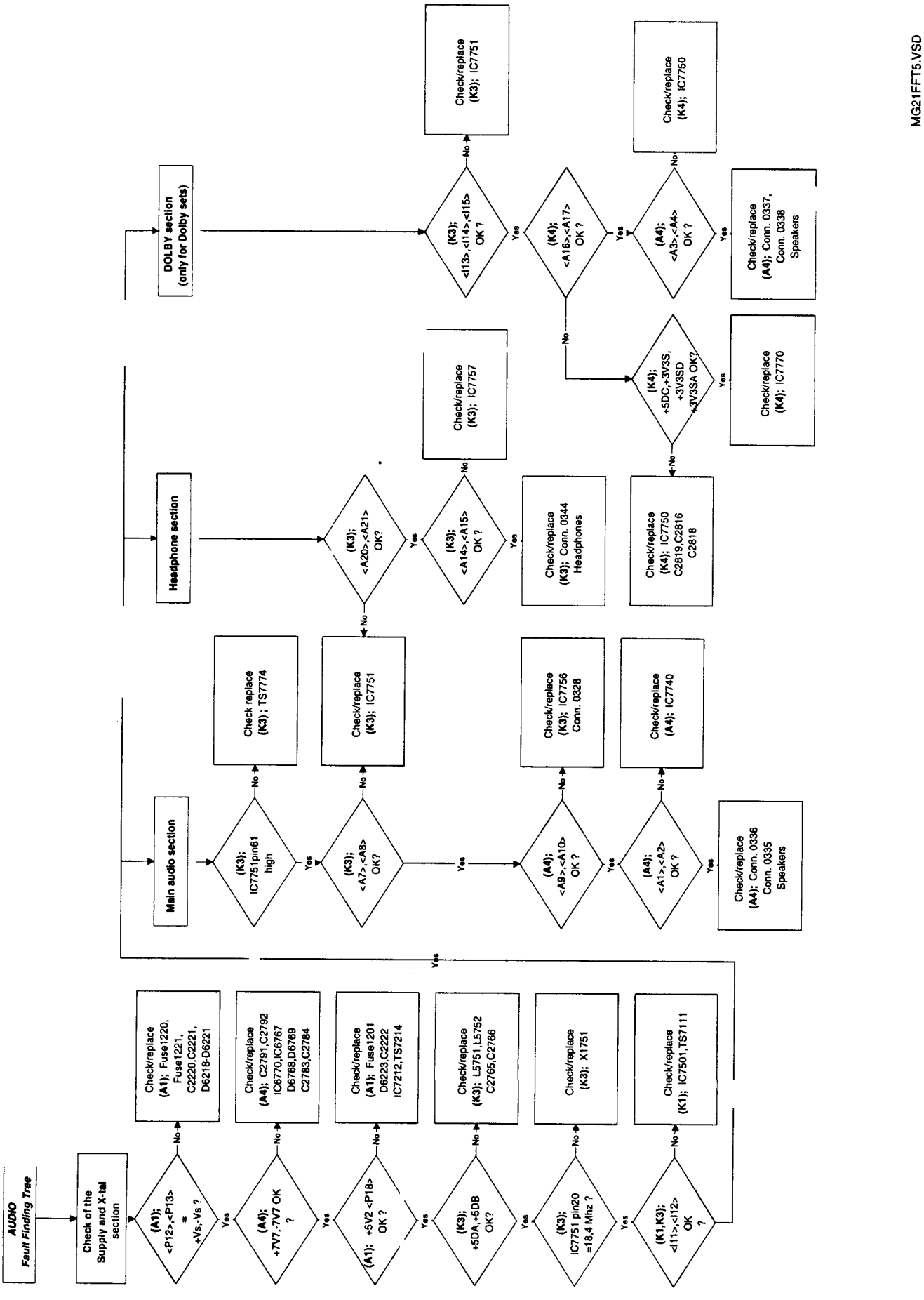

AUDIO
Fault Finding Tree
Check of the Supply and X-tal section
(A1); <P12>,<P13> = +Vs,-Vs ?
Check/replace (A1); Fuse1220, Fuse1221, C2220,C2221, D6218-D6221
(A4); +7V7,-7V7 OK ?
Check/replace (A4); C2791,C2792 IC6770,IC6767 D6768,D6769 C2783,C2784
(A1); +5V2 <P18> OK ?
Check/replace (A1); Fuse1201 D6223,C2222 IC7212,TS7214
(K3); +5DA,+5DB OK?
Check/replace (K3); L5751,L5752 C2765,C2766
(K3); IC7751 pin20 =18,4 Mhz ?
Check/replace (K3); X1751
(K1,K3); <I11>,<I12> OK ?
Check/replace (K1); IC7501,TS7111
Main audio section
(K3); IC7751pin61 high
Check replace (K3) ; TS7774
(K3); <A7>,<A8> OK?
Check/replace (K3); IC7751
(A4); <A9>,<A10> OK ?
Check/replace (K3); IC7756 Conn. 0328
(A4); <A1>,<A2> OK ?
Check/replace (A4); IC7740
Check/replace (A4); Conn. 0336 Conn. 0335 Speakers
Headphone section
(K3); <A20>,<A21> OK?
Check/replace (K3); IC7757
(K3); <A14>,<A15> OK ?
Check/replace (K3); Conn. 0344 Headphones
DOLBY section (only for Dolby sets)
(K3); <I13>,<I14>,<I15> OK ?
Check/replace (K3); IC7751
(K4); <A16>,<A17> OK ?
Check/replace (K4); IC7750
(A4); <A3>,<A4> OK ?
Check/replace (A4); Conn. 0337, Conn. 0338 Speakers
(K4); +5DC,+3V3S, +3V3SD +3V3SA OK?
Check/replace (K4); IC7770
Check/replace (K4); IC7750 C2819,C2816 C2818
Yes
No
MG21FT5.VSD

Figure 5-15

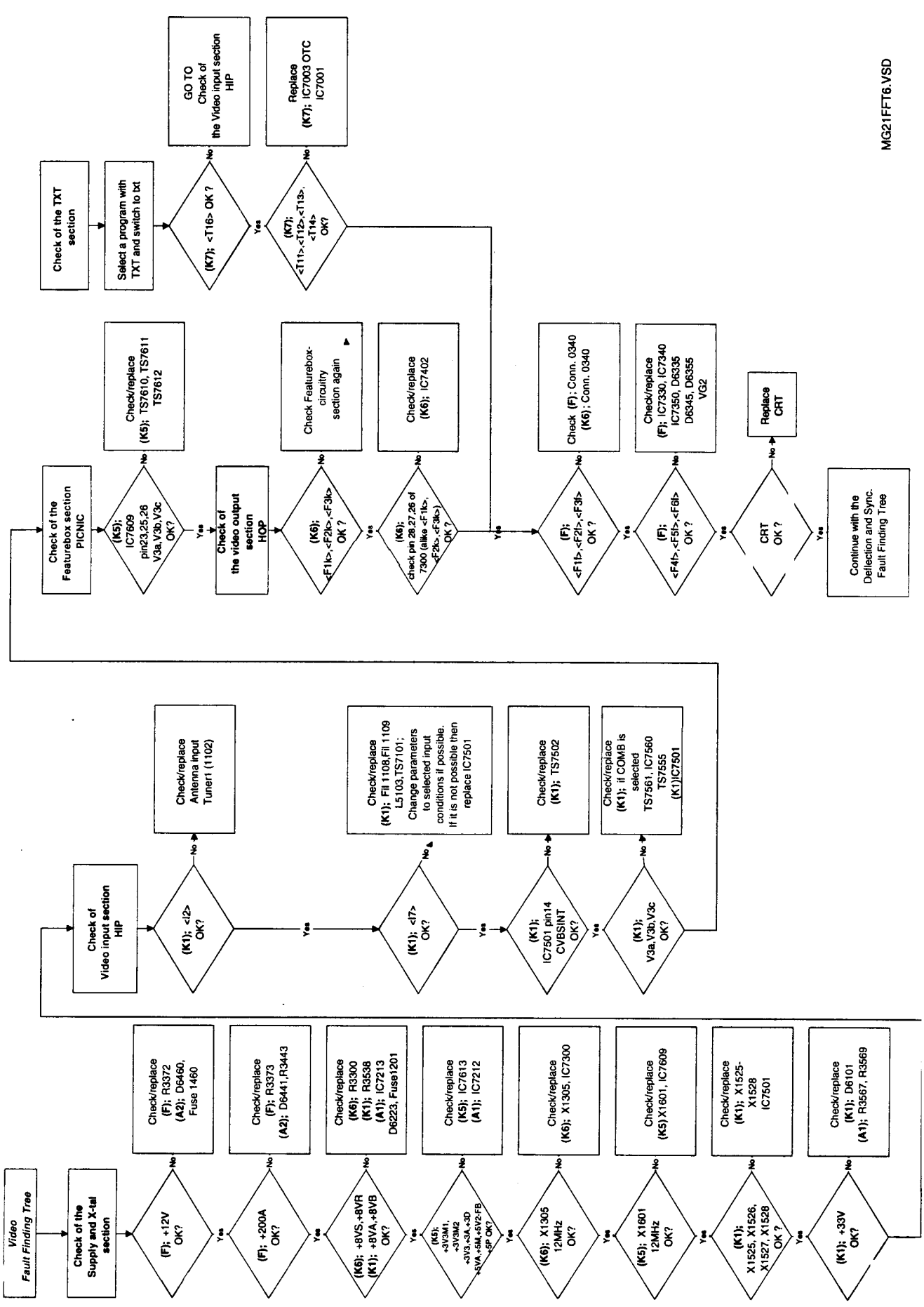
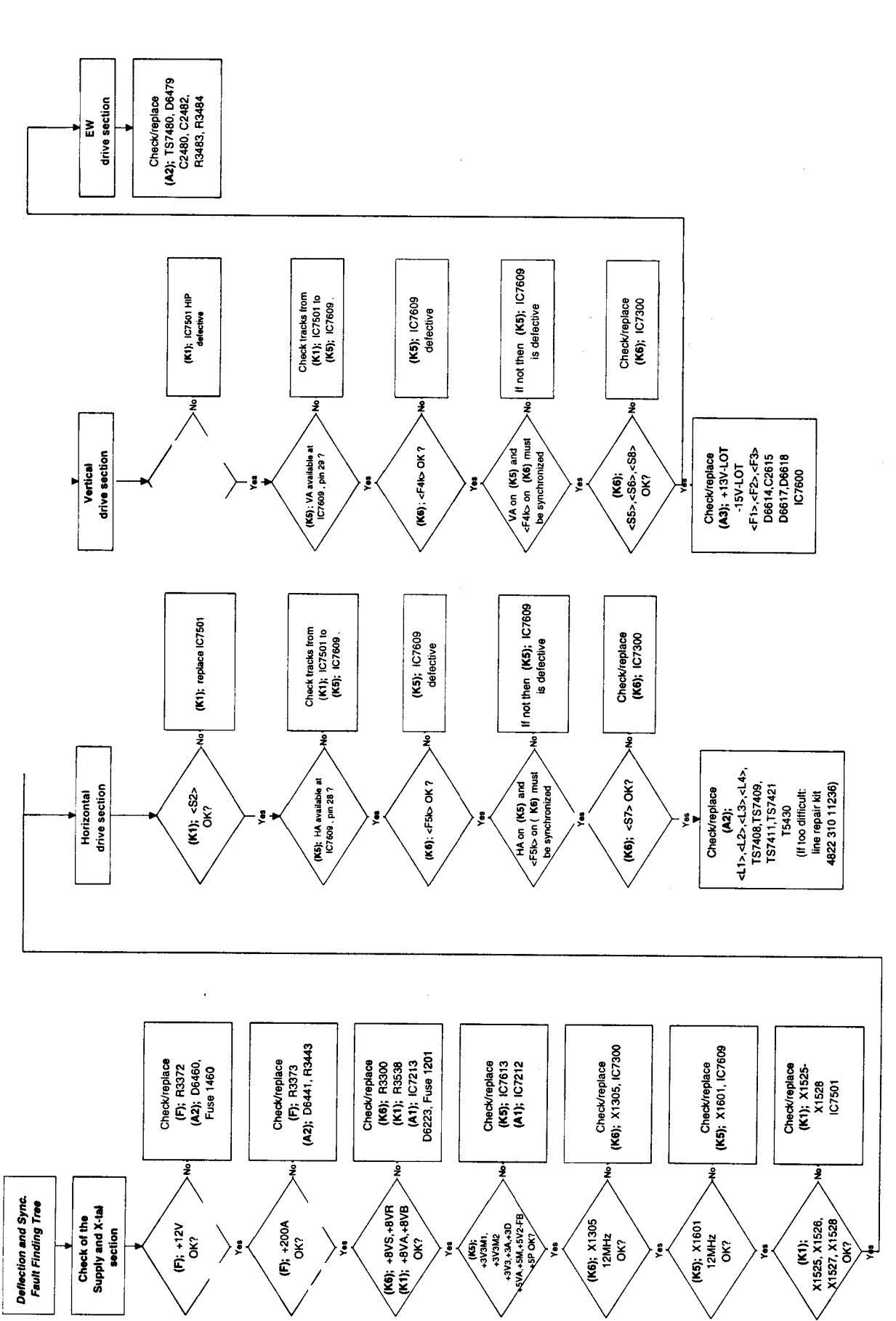

Video Fault Finding Tree
Check of the Supply and X-tal section
(F); +12V OK?
Check/replace (F); R3372 (A2); D6460, Fuse 1460
(F); +200A OK?
Check/replace (F); R3373 (A2); D6441,R3443
(K6); +8VS,+8VR (K1); +8VA,+8VB OK?
Check/replace (K6); R3300 (K1); R3538 (A1); IC7213 D6223, Fuse1201
(K5); +3V3M1, +3V3M2 +3V3,+3A,+3D +5VA,+5M,+5V2-FB +5P OK?
Check/replace (K5); IC7613 (A1); IC7212
(K6); X1305 12MHz OK?
Check/replace (K6); X1305, IC7300
(K5); X1601 12MHz OK?
Check/replace (K5) X1601, IC7609
(K1); X1525, X1526, X1527, X1528 OK ?
Check/replace (K1); X1525-X1528 IC7501
(K1); +33V OK?
Check/replace (K1); D6101 (A1); R3567, R3569
Check of Video input section HIP
(K1); <i2> OK?
Check/replace Antenna input Tuner1 (1102)
(K1); <i7> OK?
Check/replace (K1); FII 1108,FII 1109 L5103,TS7101; Change parameters to selected input conditions if possible. If it is not possible then replace IC7501
(K1); IC7501 pin14 CVBSINT OK?
Check/replace (K1); TS7502
(K1); V3a,V3b,V3c OK?
Check/replace (K1); if COMB is selected TS7561, IC7560 TS7555 (K1)IC7501
Check of the Featurebox section PICNIC
(K5); IC7609 pin23,25,26 V3a,V3b,V3c OK?
Check/replace (K5); TS7610, TS7611 TS7612
Check of the video output section HOP
(K6); <F1k>,<F2k>,<F3k> OK ?
Check Featurebox-circuitry section again
(K6); Check pin 28,27,26 of 7300 (alike <F1k>, <F2k>,<F3k>) OK ?
Check/replace (K6); IC7402
(F); <F1f>,<F2f>,<F3f> OK ?
Check (F); Conn. 0340 (K6); Conn. 0340
(F); <F4f>,<F5f>,<F6f> OK ?
Check/replace (F); IC7330, IC7340 IC7350, D6335 D6345, D6355 VG2
CRT OK ?
Replace CRT
Continue with the Deflection and Sync. Fault Finding Tree
Check of the TXT section
Select a program with TXT and switch to txt
(K7); <T16> OK ?
GO TO Check of the Video input section HIP
(K7); <T11>,<T12>,<T13>, <T14> OK?
Replace (K7); IC7003 OTC IC7001
Yes
No
MG21FFT6.VSD

Figure 5-16



MG21FFT7.VSD

8 Electrical alignments

8.1 General alignment conditions

All electrical alignments should be made under the following conditions:

- Power supply voltage: 220-240V ± 10%; 50-60 Hz ± 5%
- Warm-up time >10 minutes
- Voltages and oscillograms are measured in relation to tuner earth (with exception to the voltages on the primary side - of the power supply). Never use the cooling fins/ plates as ground.
- Test probe: Ri > 10 MOHM, Ci < 20 pF.

8.2 Alignments on the large signal panel (LSP)

+141V (VBAT) supply voltage

Connect a voltmeter across C2569 (diagram A1, +VBAT).
Switch on the set.
Using potentiometer R3559 (diagram A1) adjust the VBAT supply voltage to +141V ± 0V5. (see fig. 8.1)

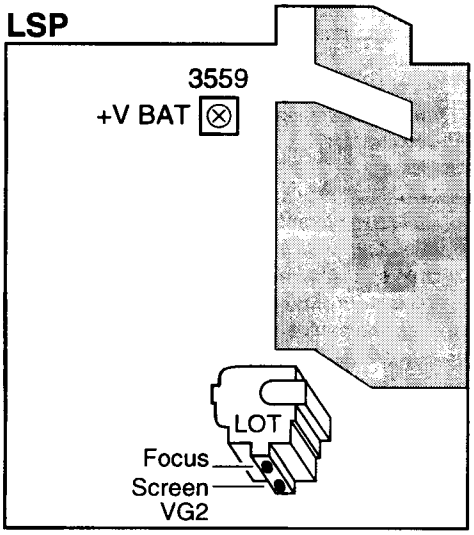


Figure 8-1

Focusing

Tune the set to a cross hatch test-pattern.
Adjust the focus potentiometer (diagram A1, upper knob on the LOT) for an overall optimum focusing of the picture.

Vg2 adjustment

Elucidation: In the frame blanking period of the R,G and B signals applied to the CRT, alternately per frame two measuring pulses with different DC levels are inserted by the "HOP" video processor IC7300. In one frame blanking a pulse is inserted used as reference for the Vg2 adjustment and in the next frame blanking a pulse is inserted used as reference for the internal white "D" adjustment. For the Vg2 adjustment the pulse with the highest DC-level is used.

Put the set in the SDM mode (via the <default> button on the DST, or via short circuiting the SDM pins 2 and 3 of connector 0356 on the SSP (diagram K7).
Insert a black test-pattern signal (carrier 475.25 MHz) to the tuner input.
Connect an oscilloscope (position 50V/Div DC and 2ms/ Div) alternately to the CRT cathodes (red pin 8, green pin 6, blue pin 11) and measure for each cathode the DC level of the measuring pulse (see elucidation above and fig. 8.2) and write down each value. Remark: Trigger the scope extern via a CVBS signal (for instance via pin 19 of the scart1 connection).
- Adjust the VG2 potentiometer (fig. 8.1, lower knob on the LOT) so that the measuring pulse with the highest noted level is on 160V level.

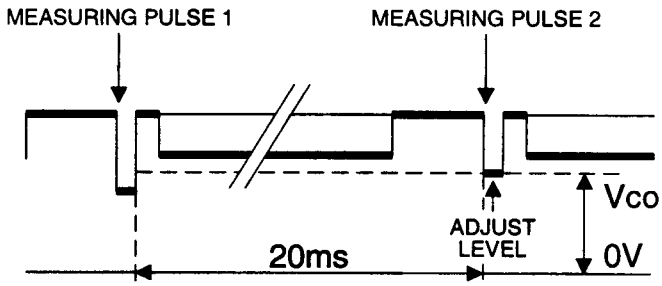


Figure 8-2

8.3 Alignments on the small signal panel (SSP)

8.3.1 40.4 MHz neighbour-channel sound trap

- Tune to a checker board test-pattern (system BG or relevant system - and carrier frequency of 475.25 MHz).
- Connect an oscilloscope (trigger line frequent) to pin 19 (CVBS out) of the scart1 connection.
- Turn the core of L5103 (diagram K1) completely downwards. (see fig. 8.3)
- Turn the core upwards till under and overshoot arise at the black/white and white/black transitions in the video signal. (see fig. 8.4)
- Turn the core downwards again till above mentioned under and overshoot is just disappeared.

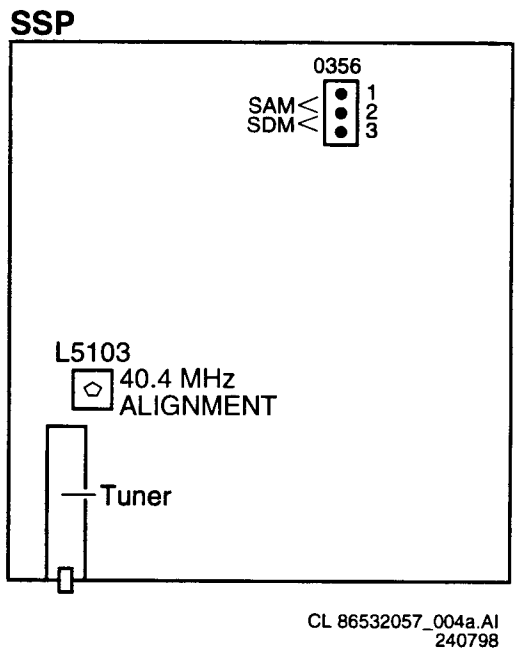


Figure 8-3

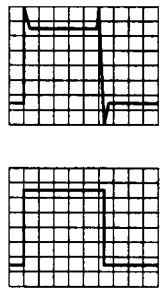


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Figure 8-4

8.4 Alignments needing SAM-mode + measuring equipment

(these alignments could be of interest when ICs (7501, TDA9320H), or the EAROM (7008, ST24E16) are exchanged on the SSP)

8.4.1 'IF AFC' (navigation to this menu item via Alignment --> General--> IF AFC)

Supply via a Service generator (e.g. PM5518) a TV-signal, with a signal-strength of about 1 mV. Preferable this signal is a multiburst signal. Frequency 475.25 Mhz. Use BG if possible, otherwise match the system of your generator with the received signal in the set. In this procedure Servicer will be asked to swap sometimes from Install-menu to Service Alignment Menu. Procedure how to check correct alignment:

- First set frequency TV-set to 475 Mhz in 'search-line' of Manual Installation Menu
- IF frequency-value in 'Fine Tune'-line between 475.18 and 475.31, you do not need to re-align AFC-value as mentioned above (SAM-menu)
- IF this is NOT the case, decrease 'IF AFC'-value (in SAM-menu) if frequency on 'Fine-tune'-line was lower than 475.18, or increase 'IF AFC'-value if frequency on 'Fine-tune'-line was higher than 475.31. (initiallly first a 'IF AFC'-alignment can be done, making the multiburst signal flat. This signal can be measured at pin 19 of scart 1. This is however not accurate enough to optimise the 'IF AFC'.

Alignment procedure:

- set 'IF AFC'-value in SAM
- store in SAM this setting
- go to manual install menu
- set frequency to 475
- read in 'Fine tune'-line how set responds
- if this value is between 475.18 and 475.31 then OK, otherwise proceed alignment by setting other 'IF AFC'-setting

Service-tip:

If you do not trust the accuracy of the frequency of your Service-generator first 'measure' with 'Fine tune'-line (manual install-menu) of a good set your Service generator.

8.4.2 'Tuner AGC'

Supply a TV-signal, with a frequency of 475.25 Mhz and a signal-strength of about 2 mV.

Measure the DC-voltage on pin 1 of the Tuner. (item 1102) With the 'Tuner AGC'-alignment in the SAM-menu , this voltage can be aligned. Alignment is correct when DC-voltage is just below 3.8 V

8.5 Alignments and settings in the Service Alignment Menu

8.5.1 General

To switch to SAM-mode you have to do the following:

briefly shorting the service pins 'SERVICE ALIGNMENT MODE' on the frontside of the SSP (pins 1 and 2 of connector 0356) or:
pressing the <align>- key on the Dealer Service Tool (DST) (RC7150), followed by keying in the password "3140" and then pressing the <OK> key.

The Service Alignment Mode menu will now appear on the screen. The following information is now displayed:

1. The software date ('Date') and version ('ID.') of the ROM. (Example: MG21E11.0_01381) (this software-code stands for MG21 (chassis), E for Europe, 1-language, 1.0 software version, xxxxx latest 5 digits of 12nc code software)
2. The accumulated total of operation hours ('Operation Hours').
3. ('Errors') followed by maximal 10 errors. The most recent error is displayed at the upper left. For explanation errors see chapter 5
4. ('Defect. Module'). Here the module that generates the error is displayed. (if there are multiple errors in the buffer that have not all been generated by a single module, there is probably another defect. The message 'Unknown' will then be displayed here).
5. ('Reset Error Buffer'). The error buffer can be resetted by pressing the 'cursor right' key.
6. ('Functional Test'). All devices are tested via the > key. Eventual errors are displayed in the error buffer. The error buffer is not erased, the contents return when the Functional Test is terminated.
7. ('Alignments'). This enables the Alignments sub-menu to be called up.

The following alignments can be selected:

'General':

- Alignment of 'Drive'
- 'Peak White Limiter'
- 'Luminance Delays'
- 'EHT Compensation'
- 'Soft Clipper'
- 'Luma Gain'
- 'IF AFC'
- 'Tuner AGC'

'Normal Geometry':

- General geometry alignments.

'Super wide geometry': (only valid for widescreen sets)

- Geometry alignments for the 'Panorama' position in 16:9 sets. (only valid for wide screen sets; alignments can be performed, however it is better to set values as mentioned below)

'Options':

- Setting the initialisation codes in the set via text.

'Option number':

All options together, expressed in two long numbers. The original factory setting for these numbers can be found on the picture tube sticker on the inside of the set.

'Store':

- Store all alignments.

'Store default settings'.

Reset all values in the EAROM to pre-programmed values, related to picture and sound settings (has the same effect as replacing the EAROM with a new one, only here also the programs are gone).

The alignments are explained now in the sequence of the sub-menu:

8.5.2 General alignments in Service Alignment Menu:

Once all alignments/settings have been completed the item 'Store' must be selected to record all the values in the permanent memory of the set.
If the option codes have been changed and stored, the set has to be switched on and off using the mains switch to activate the new settings (when switching on and off via Standby, the option code settings are NOT read by the microprocessor).
If an empty EAROM (permanent memory) is detected, all settings are set to pre-programmed default (standard) values.
A built-in test pattern can be called up in various sub-menus. The test pattern generator can be switched on using the item 'Test pattern on/off'. The test pattern only appears AFTER the specific alignment has been selected. The test patterns are generated by the teletext-IC.

'Drive'
Tint-settings:

Set the white levels for the three tint-settings 'Normal' . 'Warm' and 'Cool' is calculated by the processor then ('Warm': R+4, B-7 and 'Cool': R-3, B+3) For 4:3 picture tubes (25" and 29") the next values must be entered:

	Cool	Normal	Warm
R	22	25	29
G	20	20	20
B	17	14	7

For wide screen picture tubes (24", 28" and 32") the next values must be entered:

	Cool	Normal	Warm
R	22	25	29
G	20	20	20
B	17	14	7

'Cathode':

This alignment, must also be covered by a table with values for all picture-tube sizes. For 4:3 picture tubes (25" and 29") the next value must be entered: 5 For wide screen picture tubes (24", 28" and 32") the next values must be entered:

'Peak White Limiter'
Dependent of the picture-tube size (25", 29", and 24"/28"/32" widescreen tubes) the next value of the table must be

entered:

24"	10
25"	10
28"	10
29"	10
32"	10

'Luminance delays'
With the 'Luminance delays' alignment the luminance information is placed on the chrominance information (brightness is pushed onto the colour). Use a colour bar/ grey scale pattern as test signal.

Lum. Delay Pal: Apply a PAL colour bar/greyscale pattern as a test signal. Adjust 'Lum. Delay Pal' until the transients of the colour part and black and white part of the test pattern are at the same position.
Lum. Delay Secam: Apply a SECAM colour bar/greyscale pattern as a test signal. Adjust 'Lum. Delay Pal' until the transients of the colour part and black and white part of the test pattern are at the same position.
Lum. Delay Bypass: Apply a NTSC colour bar/greyscale pattern as a test signal. Adjust 'Lum. Delay Bypass' until the transients of the colour part and black and white part of the test pattern are at the same position.

'EHT compensation'
Fixed value: 0

'Soft clipper"
Fixed setting: 'Pwl+0%'

'Luma gain'
Fixed value:

'IF AFC'
See chapter 8.4.1. The SAM-mode is needed to make alignment, a test generator to make signal, an oscilloscope to measure at scart-output and the Install-menu to check finetuning-value

'Tuner AGC'
See chapter 8.4.2. The SAM-mode is needed to make alignment, a test generator to make signal, a DC-Voltmeter to measure at pin 1 of Tuner.

8.5.3 Geometry alignments 'Normal Geometry' in the Service Alignment Menu

Vertical amplitude and centring
Select 'Test Pattern on'

Set the begin conditions for 4:3 sets (25", 28" and 29"):

- Vertical S-correction value on 13 for 29"-set and on 19 for the 25"- and 28"-sets.

The boundary-stripes of the test pattern should be positioned on the edge of the picturetube.

Set the begin conditions for 16:9 sets (24", 28", 32"):

- Vertical S-correction value on 7 for 24"-set, on 8 for the 28" and on 7 for the 32"-set.

The boundary-stripes of the test pattern should be positioned on the edge of the picturetube.

1. Align 'Vslope' (when aligning the below half of the picture is blanked). The middle line of the test pattern must be matched with the edge of this blanking/picture transient in the middle of the picture. Pushing > button again, gives you previous menu again. (This alignment is meant to align the zero-crossing of the frame-deflection to the mechanical middle of the picture tube)
2. Align the vertical amplitude using 'V amplitude' so that the test pattern is fully visible.
3. Align the vertical centring using 'V shift' so that the test pattern is located vertically in the middle.
4. If necessary repeat the alignment of 'V amplitude', in order to get 'V shift' OK.

Vertical S correction
Select 'Test pattern on'

Align the vertical S correction using 'V S-correction' so that the vertical amplitude at the top of the picture is equal to the amplitude in the middle of the picture.

Horizontal centring and amplitude
Select 'Test pattern on'.

1. Using 'H amplitude' align the horizontal amplitude so that the entire test pattern is visible.
2. Use an external test signal, with a centre-reference from a service-generator. Use 'H shift' to align the picture horizontally in the middle.
3. Repeat the 'H amplitude' alignment if necessary.

East/west alignment
Select 'Test pattern on'.

1. Use 'East/West Parabola' to align the vertical lines until straight.
2. Use 'East/West Corner' to align the vertical lines in the corners until straight.
3. Use 'East/West Trapezium' to align for a rectangular
4. Use 'Horizontal Parallelogram' to align for straight vertical lines if necessary.
5. If necessary select 'East/West Corner' and align as required.
6. Repeat steps 1 to 4 if necessary.

8.5.4 Geometry alignments 'Super wide geometry' in the Service Alignment Menu

Only applicable to 16:9 sets

The header of this paragraph and also the menu's are misleading.

We only need to set the following values, if the normal geometry alignment has been performed correctly.

Vertical S correction: enter the value of normal geometry.
Horizontal amplitude: enter the value of normal geometry subtracted by 4.
East/west parabola: enter the value of normal geometry.

8.6 Option menu

Introduction

The microprocessor communicates with a large number of I^2C-ICs in the set. To ensure good communication and make digital diagnosis possible, the microprocessor has to know which ICs have to be addressed. The presence of specific ICs or functions is made known by means of the option codes.

All options codes can be manipulated using both the option numbers and/or the Option menu.

All hardware related options are incorporated under the heading 'Options' of the 'Alignments' sub-menu of the 'Service Alignment Mode'.

All software related options that are incorporated under the heading 'Dealer Options' of the 'Service Alignment Mode", can also be reached directly via the <dealer>-button of the DST.

8.7 Dealer Options in the Service Alignment Mode

Menu-item	Subjects	Options	Physically in the set
Teletext	TXT	Yes	Teletext software feature on
		No	Teletext software feature off
Communication	Easylink	Yes	Project 50 (easylink) set
		No	No project 50 (easylink) set
Picture tube	CRT Type	4:3	4:3 picture tube
		16:9	16:9 picture tube
	only for 1 6:9: Picture Rotation	Yes	Frame rotation circuitry present on LSP (IC7440 diagram A3)
		No	Frame rotation circuitry not present on LSP (IC7440 diagram A3)
Video Repro Options	Feature box type	100Hz	IC7606 present on SSP (diagram K5)
		Digital Scan	IC7606 and IC7607 present on SSP (diagram K5)
	Combfilter	Yes	IC7560 present on SSP (diagram K1)
		No	IC7560 not present on SSP (diagram K1)
	Picnic AGC	Yes	In normal operation: Yes
		No	During 'Drive' alignments: No
	TXT Dualscreen	Yes	TXT DualScreen software feature on
		No	TXT DualScreen software feature off
	EPG Dualscreen	Yes	IC7013 present on the SSP (diagram K7)
		No	IC7013 not present on the SSP (diagram K7)
Source Selection	External 3	Yes	3rd EURO connector present
		No	No 3rd EURO connector present
Audio Repro	Acoustic system	Normal	Applicable for sets without subwoofer
		Enhanced	Applicable for sets with subwoofer
Miscellaneous	NextView	Yes	NextView present
		No	Nextview not present
	Heatsink Present	Yes	Heatsinks present on CRT/Scavem panel (diagram F)
		No	Heatsinks not present on CRT/Scavem panel (diagram F)

After the option(s) have been changed, they must be stored via the STORE command.
The new option is only active after the TV is switched off and then back on again using the mains switch (the EAROM is then read out again).

8.8 'Option number'

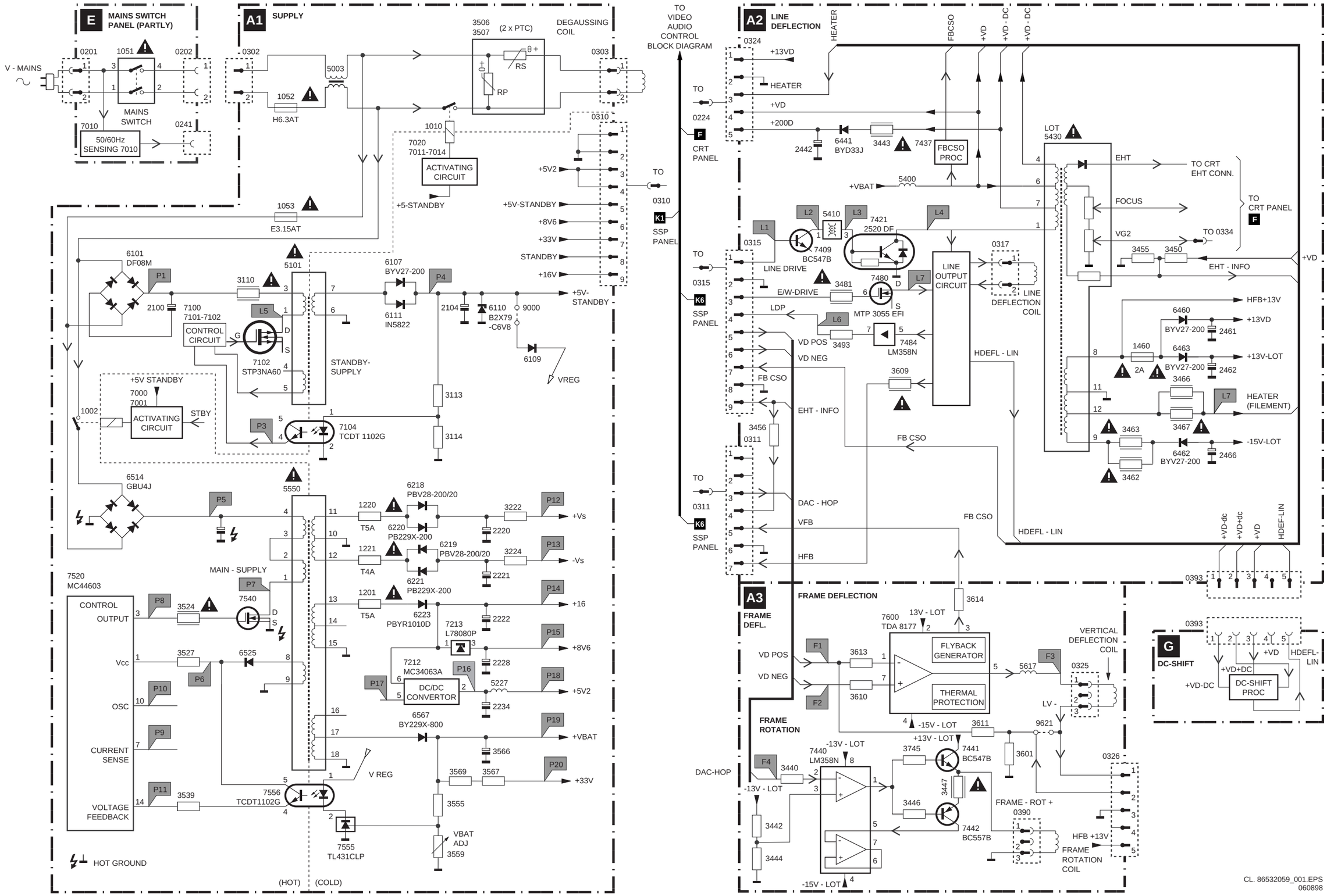
In case the EAROM has to be replaced, all the options will also require resetting. To be certain that the factory settings are reproduced exactly, both option numbers have to be set. These numbers can be found on a sticker on the picture tube.

Example: option number of 29PT8304/12 is:

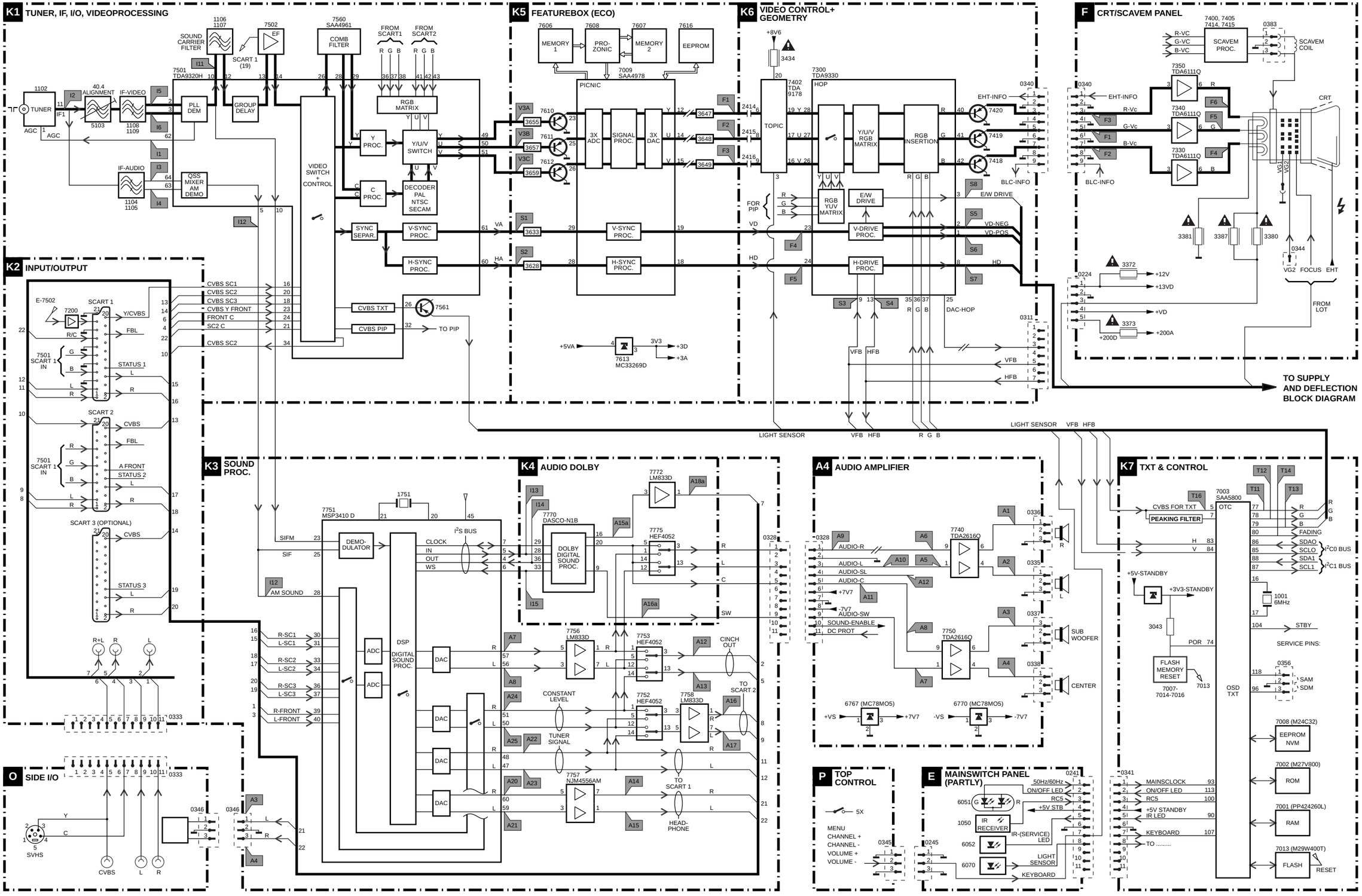
00512 04352 04096 00016

04134 00001 00000 00000

6 Block diagrams



6 Block diagrams



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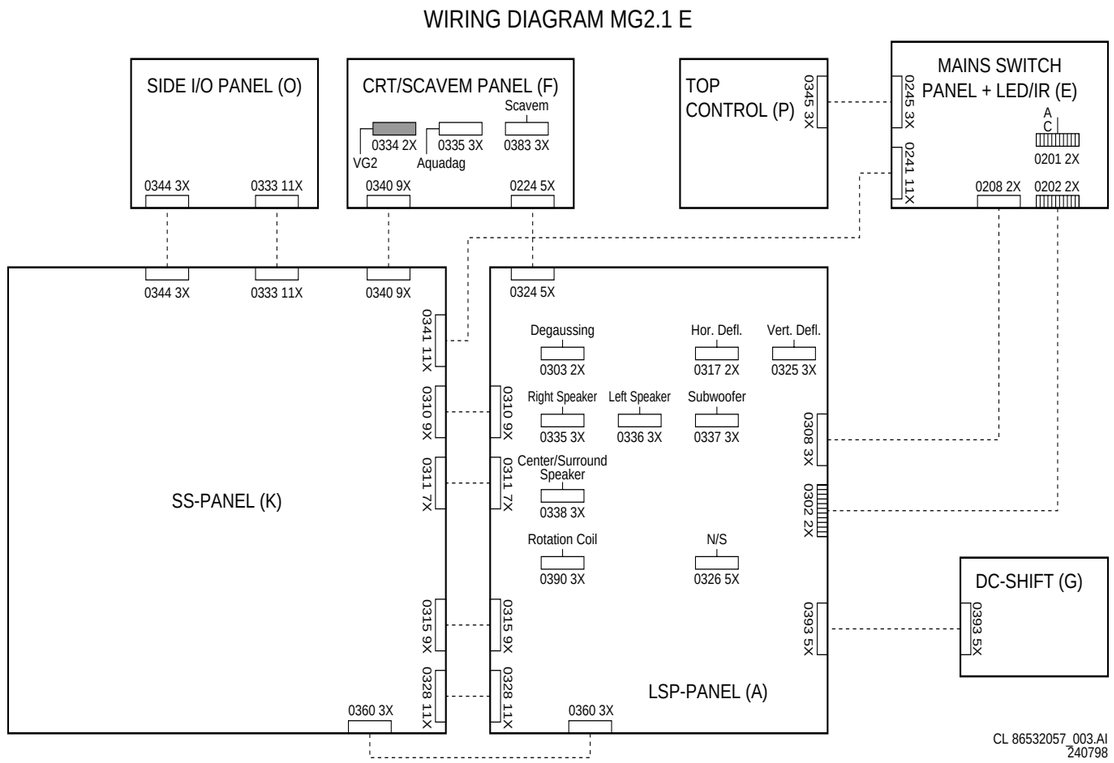
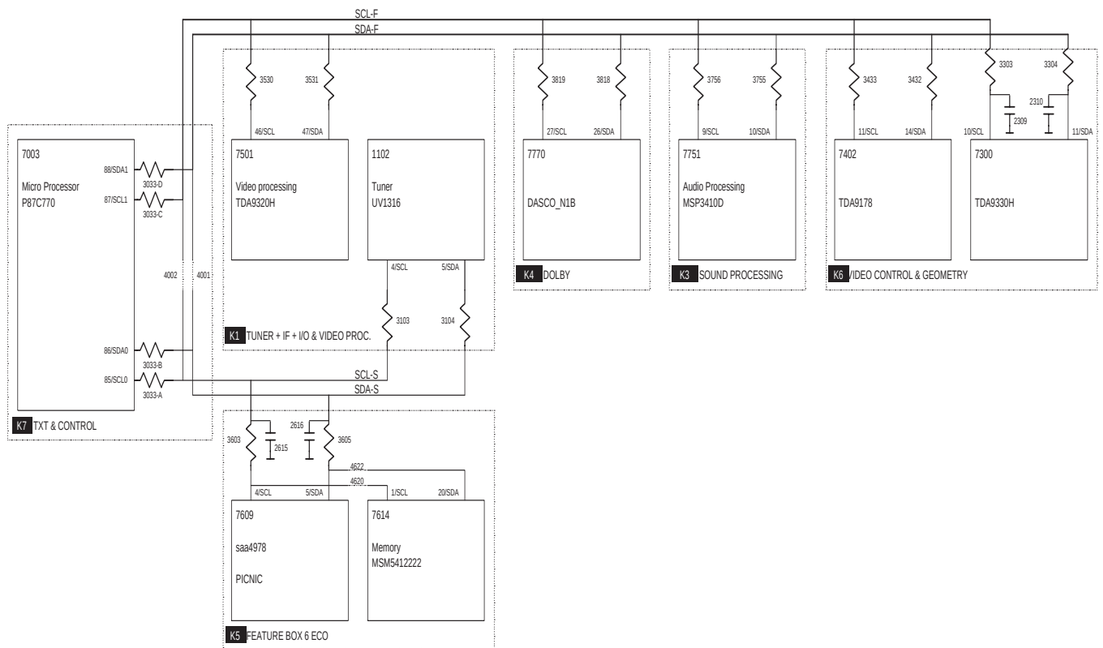
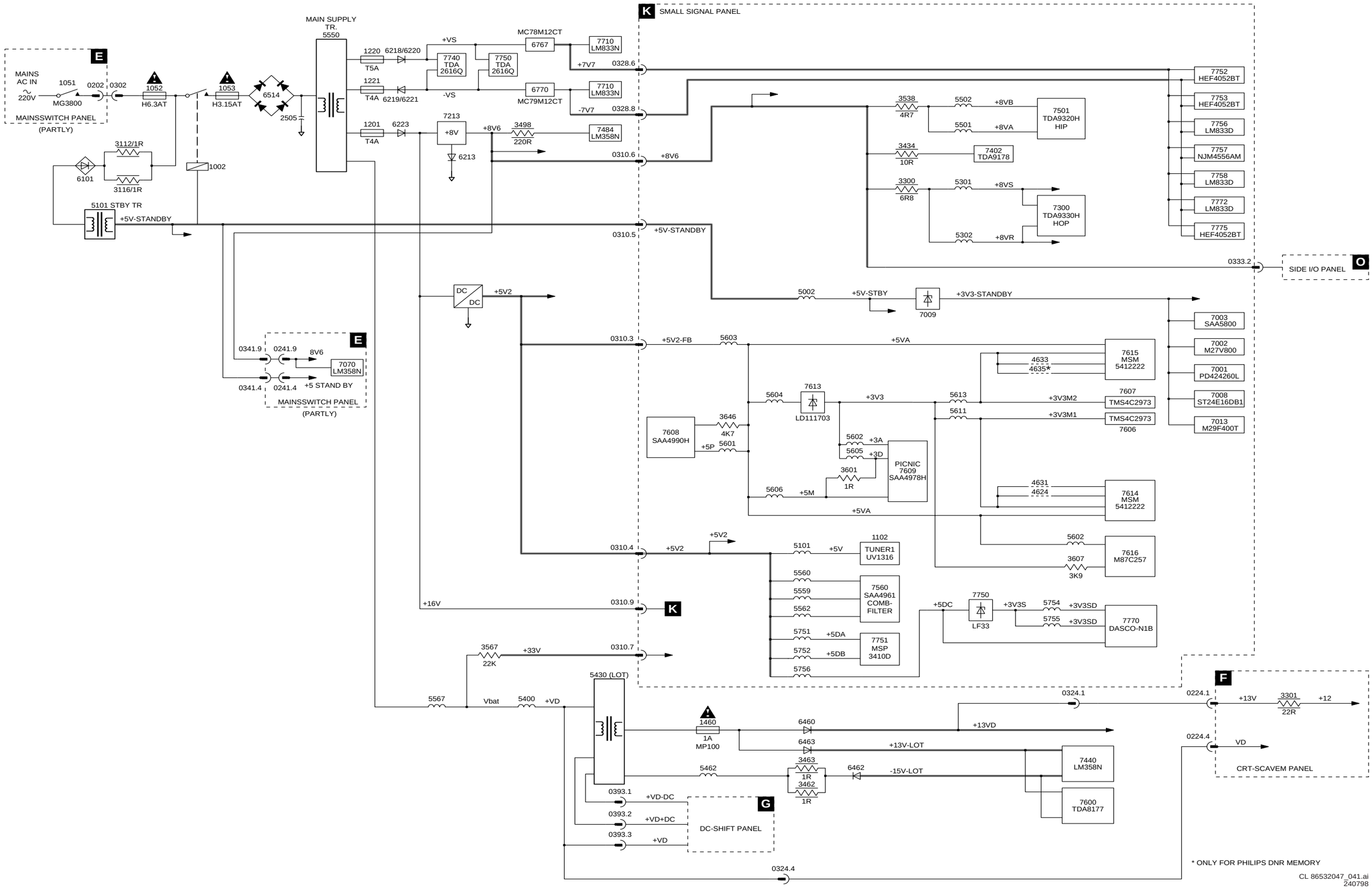
6 Block diagrams



Overview I ²C-ICs



6 Block diagrams



A1 SUPPLY LOW

DEGAUSSING SWITCHOFF CIRCUITRY

STANDBY SUPPLY

DC/DC CONVERTOR

FROM / TO 0202 OF E

FROM / TO 0310 OF K1

FROM A4

TO DEGAUSSING COIL

SUPPLY RELAY

EUR ONLY

3507 WS ONLY

E3.15AT IF MULTI VOLTAGE

E4AT IF MULTI VOLTAGE

HEATSINK 0045

VREG

DSP

DRIVE

SENSE

STBY

OVP

Vbatt adjust

*	EUR	AP
1002	X	
1053	T3.15A	T4.0A
1200	MP400	T5A
2007	10n	
2009	10n	
2053	470n	470n
2224	1u	4u7
2505	150u	330u
2506	100n	
2508		22n
2509		470n

*	EUR	AP
2520		47u
2523		100u
2533	22u	2u2
2535	820p	680p
2550	3n3	1n5
2557	33n	3n3
2570		10n
3003	2K2	
3005	1R5	
3006		1R

*	EUR	AP
3007	4K7	
3008	2K2	
3009	10K	
3229		68R
3230		22R
3512	1K	1K5
3518		
3522	680R	820R
3523		
3526	100R	180R
3532	150R	150R
3533	12K	100K
3535	15K	22K

*	EUR	AP
3537	10K	12K
3540	4R7	2R2
3546	0R39	0R33
3547	0R39	0R33
3557	33K	22K
3570		100R
3571		10K
3572		2K2
4222	X	
4224		X
5003	X	X

*	EUR	AP
5502	X	
5550	X	X
6006	X	
6109		X
6522		X
6542	X	X
7000	X	
7001	X	
7214		X
7540	X	X
7550		X
9002		X
9003	X	

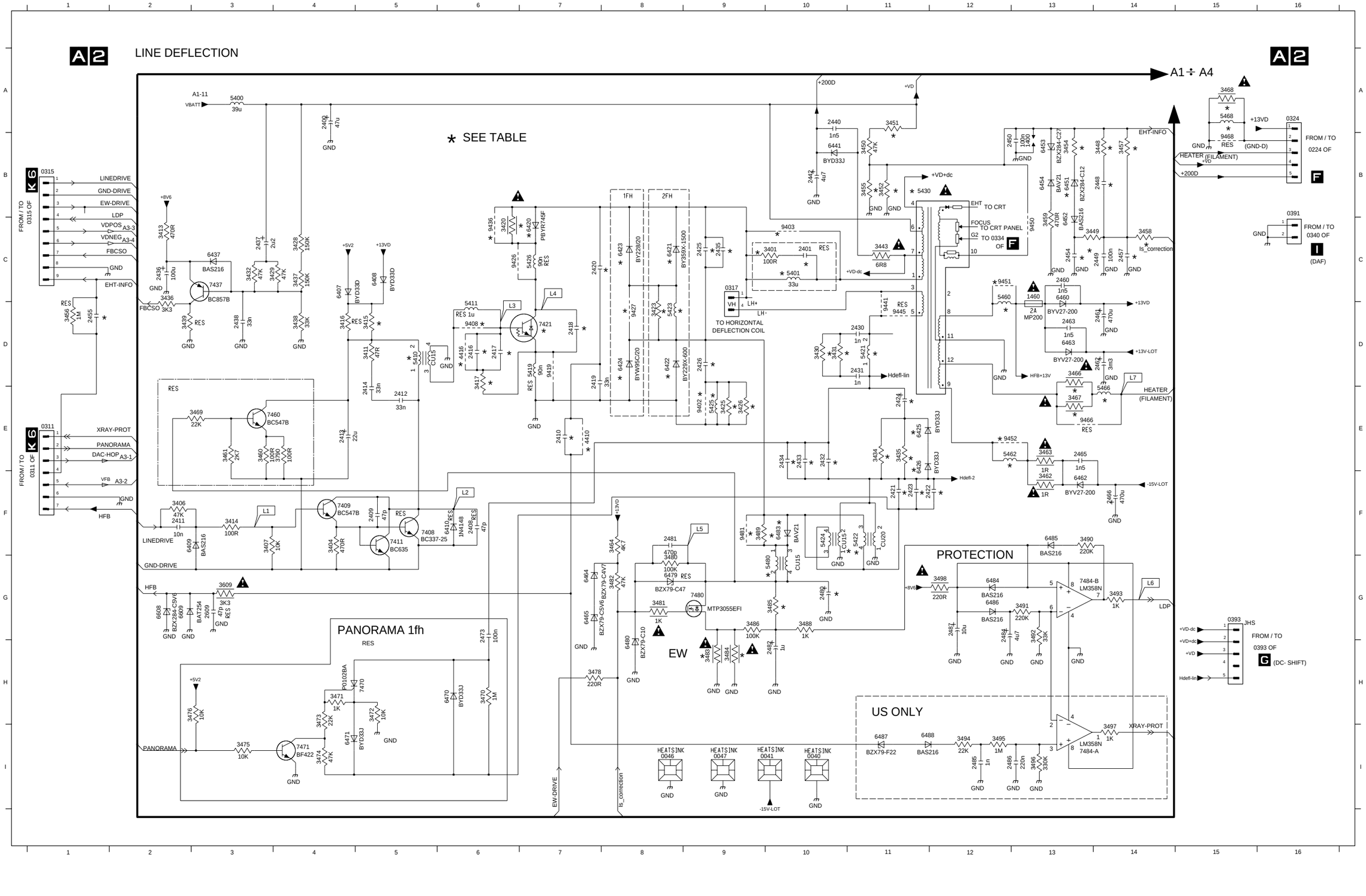
A1

*	EUR	AP
9004	X	
9223	X	
9523	X	
9539		X
9540	X	

0043 D11 3114 K4 6110 G4
0044 B7 3115 K5 6111 G3
0045 C9 3117 H2 6213 F14
0302 D1 3118 I1 6218 C13
0303 B1 3119 I3 6219 D13
0308 F2 3222 C15 6220 D13
0310 H16 3223 D15 6221 E13
1002 E4 3224 D15 6222 G15
1003 C3 3225 G14 6223 E13
1004 D3 3226 H14 6514 C7
1010 B4 3227 H16 6520 G7
1052 D1 3228 H15 6521 H10
1053 C5 3229 F15 6522 G10
1201 E13 3230 F16 6523 G10
1220 C12 3231 G16 6524 I10
1221 D12 3234 H13 6525 F10
1501 D2 3240 B13 6542 D9
2006 D5 3241 C12 6545 F10
2007 E5 3245 H16 6567 F13
2008 E5 3506 B3 6570 J14
2009 F6 3507 B2 6571 K14
2010 B5 3512 K8 6572 F9
2011 B6 3517 F7 6580 J15
2012 B6 3518 I10 6581 J15
2013 B4 3519 K8 7000 E4
2053 D2 3520 F7 7001 E5
2100 G2 3521 H5 7011 A5
2101 H3 3522 K8 7012 B6
2102 J3 3523 K7 7013 B6
2104 G4 3524 I11 7014 B7
2105 G3 3525 J6 7020 B4
2106 H3 3526 H10 7100 I2
2201 E13 3527 G9 7101 I1
2202 C13 3529 K7 7102 H1
2203 D13 3530 H11 7103 J2
2220 C14 3531 H10 7104 K4
2221 D14 3532 H10 7212 F14
2222 E13 3533 K8 7213 E14
2223 G13 3535 J6 7214 F16
2224 I13 3536 I6 7520 H6
2225 H14 3537 G7 7540 F8
2226 H14 3538 J11 7550 J13
2227 G15 3539 J11 7555 J12
2228 F14 3540 G8 7556 I12
2229 G16 3541 F8 7580 K16
2232 B13 3544 D10 9000 F3
2233 C12 3545 F10 9002 D4
2234 H16 3546 G8 9003 C6
2503 B3 3547 G9 9004 C6
2504 C8 3548 G11 9005 E6
2505 C9 3552 I13 9223 G15
2506 C1 3553 I12 9228 E12
2508 C6 3555 J13 9229 G16
2509 C1 3556 J12 9501 G16
2511 C7 3557 J13 9515 B1
2512 C8 3558 K13 9516 C1
2520 G7 3559 K12 9523 G10
2521 H10 3566 G13 9539 G8
2522 K7 3567 H13 9540 G8
2523 H10 3568 G13 9571 E15
2524 H9 3569 G13 9584 B3
2525 G9 3570 J13
2526 H10 3571 K13
2527 G10 3572 J14
2528 J10 3579 I6
2531 I5 3580 K15
2532 H6 3581 K15
2533 K9 3582 K15
2535 J6 4013 B4
2538 J11 4222 F14
2540 F9 4224 G16
2541 F8 5003 D3
2542 E9 5101 H4
2543 E9 5102 J4
2544 E10 5205 H13
2545 F10 5220 C13
2550 K12 5221 D13
2555 J12 5222 C15
2557 J12 5223 D15
2568 F13 5224 E15
2569 G13 5225 G16
2570 K13 5226 G13
2580 K16 5227 G16
3002 D3 5229 G16
3003 E5 5230 F14
3005 C5 5231 G16
3006 D5 5501 B1
3007 E5 5502 C1
3008 E6 5525 F11
3009 F6 5542 E8
3010 A5 5544 E10
3011 A5 5545 F10
3012 A5 5550 E12
3013 B4 5567 F12
3014 B4 5571 E15
3015 B5 5573 K14
3016 A6 6006 D4
3017 B5 6008 E4
3018 B6 6010 A6
3056 D2 6011 B6
3101 H2 6012 B6
3102 H3 6013 B4
3103 H2 6014 A4
3104 J3 6015 A4
3106 J2 6101 G2
3107 J2 6103 J4
3108 I1 6104 J1
3109 J2 6105 I2
3110 G3 6107 G3
3111 J3 6108 I1
3113 I5 6109 F4

7 Electrical diagrams and print lay-outs

0040 I10 0324 A16 2408 F6 2416 D6 2423 F11 2433 E10 2442 B10 2460 C13 2480 G10 2609 G3 3414 F3 3426 E9 3435 E11 3449 C13 3457 B14 3464 F8 3472 H5 3481 G8 3489 F9 3496 I13 5400 A3 5423 D8 5466 E14 6420 C7 6437 C3 6462 F13 6480 H8 6608 G2 7460 E3 9403 C10 9445 D11
0041 I9 0391 B16 2409 F5 2417 D6 2424 E11 2434 E10 2448 B14 2461 D14 2481 F8 3401 C10 3415 D5 3428 C4 3436 C2 3450 B11 3458 C14 3466 D13 3473 H4 3482 G8 3490 F13 3497 I14 5401 C10 5424 F10 5468 A15 6421 C8 6441 B10 6463 D13 6483 F10 6609 G2 7470 H5 9408 D6 9450 C13
0046 I8 0393 G15 2410 E7 2418 D7 2425 C9 2435 C9 2449 C14 2462 D14 2482 H10 3404 F4 3416 D4 3429 C4 3437 C4 3451 A11 3459 C13 3467 E13 3474 I4 3483 H9 3491 G13 3498 G12 5410 D5 5425 E9 5480 G10 6422 D8 6451 B13 6464 G7 6484 G12 7408 F5 7471 I4 9419 D7 9451 C12
0047 I9 1400 B13 2411 F2 2419 D7 2426 D9 2436 C2 2450 B13 2463 D13 2484 G12 3406 F2 3417 D6 3430 D10 3438 D4 3452 B11 3460 E3 3468 A15 3475 I3 3484 H9 3492 G13 3609 G3 5411 D6 5426 C7 6407 C4 6423 C8 6452 C13 6454 B13 6471 I4 6487 I11 7421 D7 7484-B G13 9436 C6 9468 B15
0311 E1 1460 C13 2412 E5 2420 C7 2430 D11 2437 C3 2454 C13 2465 E13 2485 I12 3407 F3 3420 C6 3431 D10 3439 D2 3454 B13 3461 E3 3469 E3 3476 H3 3485 G10 3493 G14 3790 E4 5419 D7 5430 B11 6408 C5 6424 D8 6453 B13 6470 H6 6486 G12 7411 F5 7484-A I13 9427 D8 9466 E13
0315 B1 2400 A4 2413 E4 2421 F11 2431 D11 2438 D3 2455 D1 2466 F14 2486 I13 3411 D5 3423 D8 3432 C3 3443 C11 3455 B11 3462 F13 3470 H6 3478 H7 3486 G9 3494 I12 4410 E7 5421 D11 5460 C12 6409 F2 6425 E11 6454 B13 6471 I4 6488 I11 7421 D7 7484-B G13 9436 C6 9468 B15
0317 C9 2401 C10 2414 E5 2422 F12 2432 E10 2440 A10 2457 C14 2473 G6 2487 G12 3413 C2 3425 E9 3434 E11 3448 B14 3456 D1 3463 E13 3471 H4 3480 G8 3488 G10 3495 I12 4416 D6 5422 F11 5462 E12 6410 F6 6426 E11 6460 C13 6479 G8 6488 I11 7437 C3 9402 E9 9441 D11 9481 F9



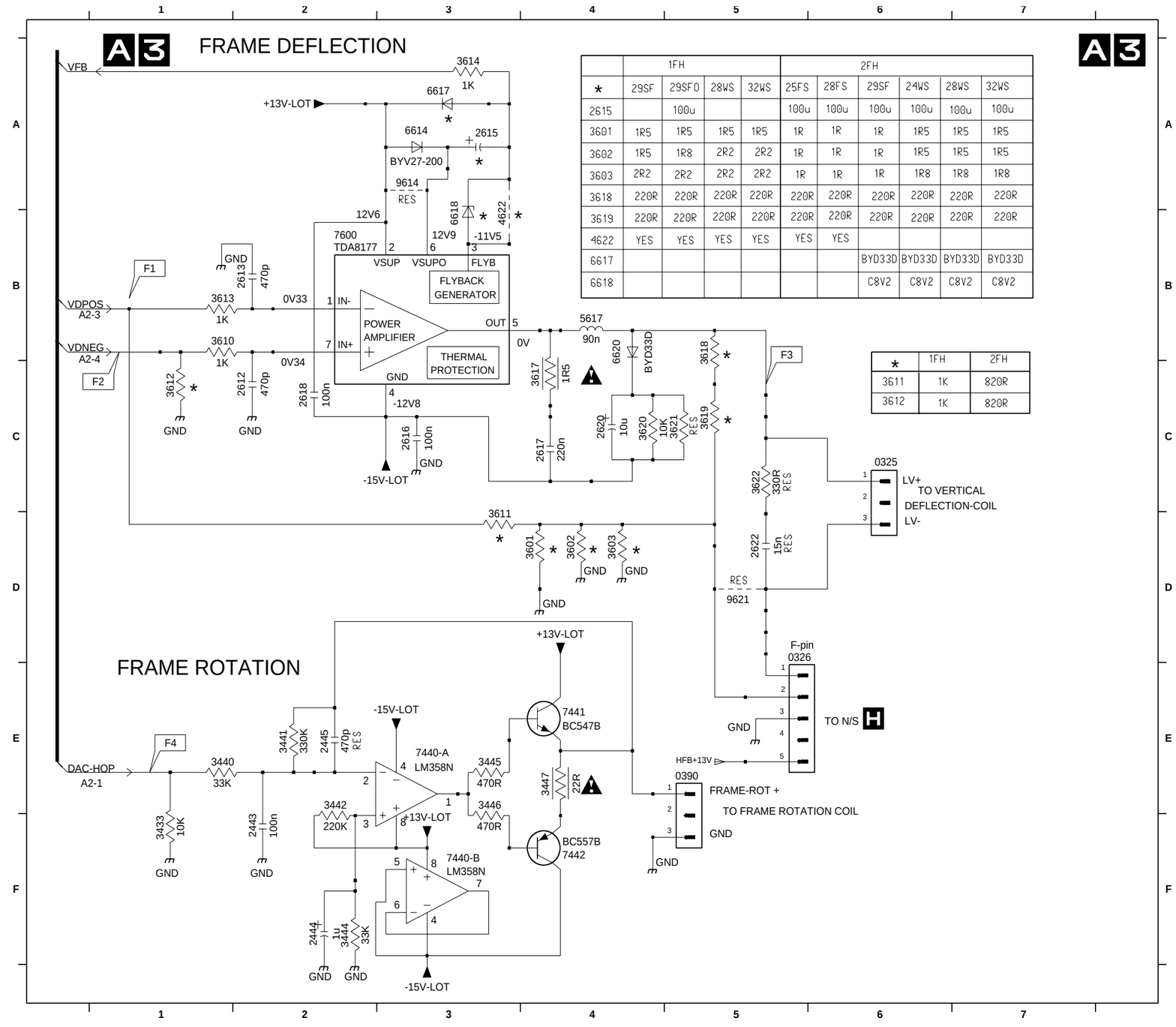
7 Electrical diagrams and print lay-outs

CRT-size related

*	1FH 29SF	29SFO	28WS	32WS	2FH 25FS	28FS	29SF	24WS	28WS	32WS
2401										
2420	2n7	2n7	3n3	2n2	1n2	1n2	1n	1n2	1n	1n
2421					470n	470n	560n			
2422								1u2	1u2	1u2
2423	470n	470n	470n	470n						
2425	15n	12n	15n	15n			11n	11n	11n	11n
2426	27n	27n	18n	22n	27n	27n	24n	27n	27n	27n
2432	560n		560n	680n						
2433					390n	470n	560n	390n	390n	430n
2434		470n								
2435					9n1	10n				
2448	10n	10n	4n7	1n5	3n3	1n5	22n	4n7	22n	22n
2454							100n		100n	100n
2457	47n	47n	47n	47n	33n	33n	100n	33n	100n	100n
3401										
3415	33R	33R	33R	33R	22R	22R	18R	18R	18R	18R
3448	100k	100k	100k	100k	10K	33K	100K	100K	100K	100K
3449	47k	47k	47k	47k	33k	220k	47k	100K	47K	47K
3451	27k	47k	27k	27k	39k	39k	27k	27k	27k	27k
3452	22k	27k	22k	22k	27k	27k	22k	22k	22k	22k
3454	10R	10R	10R	10R	10R	10R	47K	10R	47K	47K
3455	220k	220k	220k	220k			220k	220k	220k	220k
3457	560k	560k	560k	560k	1M	1M	680k	680k	560k	680k
3458	220k	220k	270k	270k	150k	100K	100K	100K	100K	100K
3467	15R	3R3	15R	15R	1R	1R				
3483	4R7	5R6	4R7	4R7	4R7	3R3	4R7	4R7	4R7	4R7
3484	4R7	4R7	4R7	4R7	4R7	4R7	4R7	10R	10R	10R
3485	7M5	5M6	7M5	7M5	5M6	5M6	7M5	5M6	5M6	7M5
5401										
5421	X	X	X	X	X	X	X	X	X	X
5422							X	X	X	X
5424	X	X	X	X	X	X				
5430	X	X	X	X	X	X	X	X	X	X
6451	C12	C12	C10	C10	C12	C12	C12	C10	C10	C10
9403	X	X	X	X	X	X	X	X	X	X

non CRT-size related

*	1FH	2FH
2410		4n7
2416		100n
2417		100n
2418		220p
2424	1u	
2455	1n5	
2457	47n	33n
2480	4u7	2u2
3417	47R	10R
3420		47R
3423		6R8
3425		10R
3426		10R
3430	3K3	1k
3431	3K3	1k
3434	33K	
3435	33k	
3466	4R7	1R
3468		150R
3489		33R
4410	X	
4416	X	
5410	X	X
5423		X
5425		X
5460		X
5462		X
5466	X	X
5468	X	X
5480	X	X
6420		X
6421		X
6422		X
6423	X	
6424	X	
6425	X	
6426	X	
6483		X
7421	2508AF	2520DF
9402	X	
9408	X	X
9427	X	
9436	X	
9451	X	
9452	X	
9481	X	

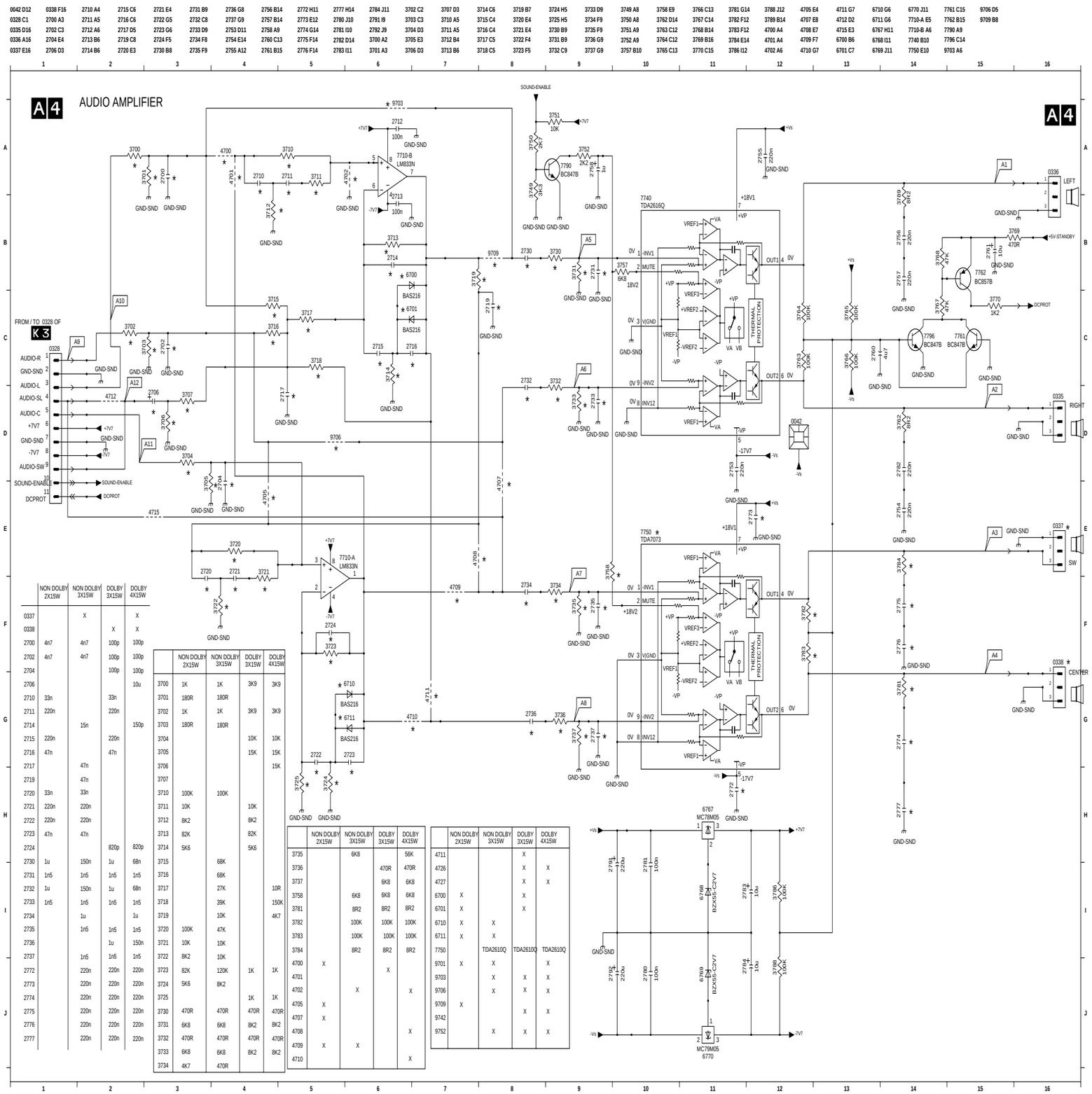


*	1FH 29SF	29SFO	28WS	32WS	2FH 25FS	28FS	29SF	24WS	28WS	32WS
2615		100u			100u	100u	100u	100u	100u	100u
3601	1R5	1R5	1R5	1R5	1R	1R	1R	1R5	1R5	1R5
3602	1R5	1R8	2R2	2R2	1R	1R	1R	1R5	1R5	1R5
3603	2R2	2R2	2R2	2R2	1R	1R	1R	1R8	1R8	1R8
3618	220R	220R	220R	220R	220R	220R	220R	220R	220R	220R
3619	220R	220R	220R	220R	220R	220R	220R	220R	220R	220R
4622	YES	YES	YES	YES	YES	YES				
6617							BYD33D	BYD33D	BYD33D	BYD33D
6618							C8V2	C8V2	C8V2	C8V2

*	1FH	2FH
3611	1K	820R
3612	1K	820R

0325 C6
0326 D5
0390 E5
2443 F2
2444 F2
2445 E2
2612 C2
2613 B2
2615 A3
2616 C3
2617 C4
2618 C2
2620 C4
2622 D5
3433 F1
3440 E1
3441 E2
3442 E2
3444 F2
3445 E3
3446 E3
3447 E4
3601 D4
3602 D4
3603 D4
3610 B1
3611 D3
3612 C1
3613 B1
3614 A3
3617 C4
3618 B5
3619 C5
3620 C4
3621 C5
3622 C5
4622 B3
5617 B4
6614 A3
6617 A3
6618 B3
6620 B4
7440-A E3
7440-B F3
7441 E4
7442 F4
7600 B2
9614 A3
9621 D5

7 Electrical diagrams and print lay-outs



	NON DOLBY 2X15W	NON DOLBY 3X15W	DOLBY 3X15W	DOLBY 4X15W
0337		X		X
0338			X	X
2700	4n7	4n7	100p	100p
2702	4n7	4n7	100p	100p
2704			100p	100p
2706				10u
2710	33n		33n	
2711	220n		220n	
2714		15n		150p
2715	220n		220n	
2716	47n		47n	
2717		47n		
2719		47n		
2720	33n	33n		
2721	220n	220n		
2722	220n	220n		
2723	47n	47n		
2724			820p	820p
2730	1u	150n	1u	68n
2731	1n5	1n5	1n5	1n5
2732	1u	150n	1u	68n
2733	1n5	1n5	1n5	1n5
2734		1u	1u	
2735		1n5	1n5	1n5
2736			1u	150n
2737		1n5	1n5	1n5
2772		220n	220n	220n
2773		220n	220n	220n
2774		220n	220n	220n
2775		220n	220n	220n
2776		220n	220n	220n
2777		220n	220n	220n

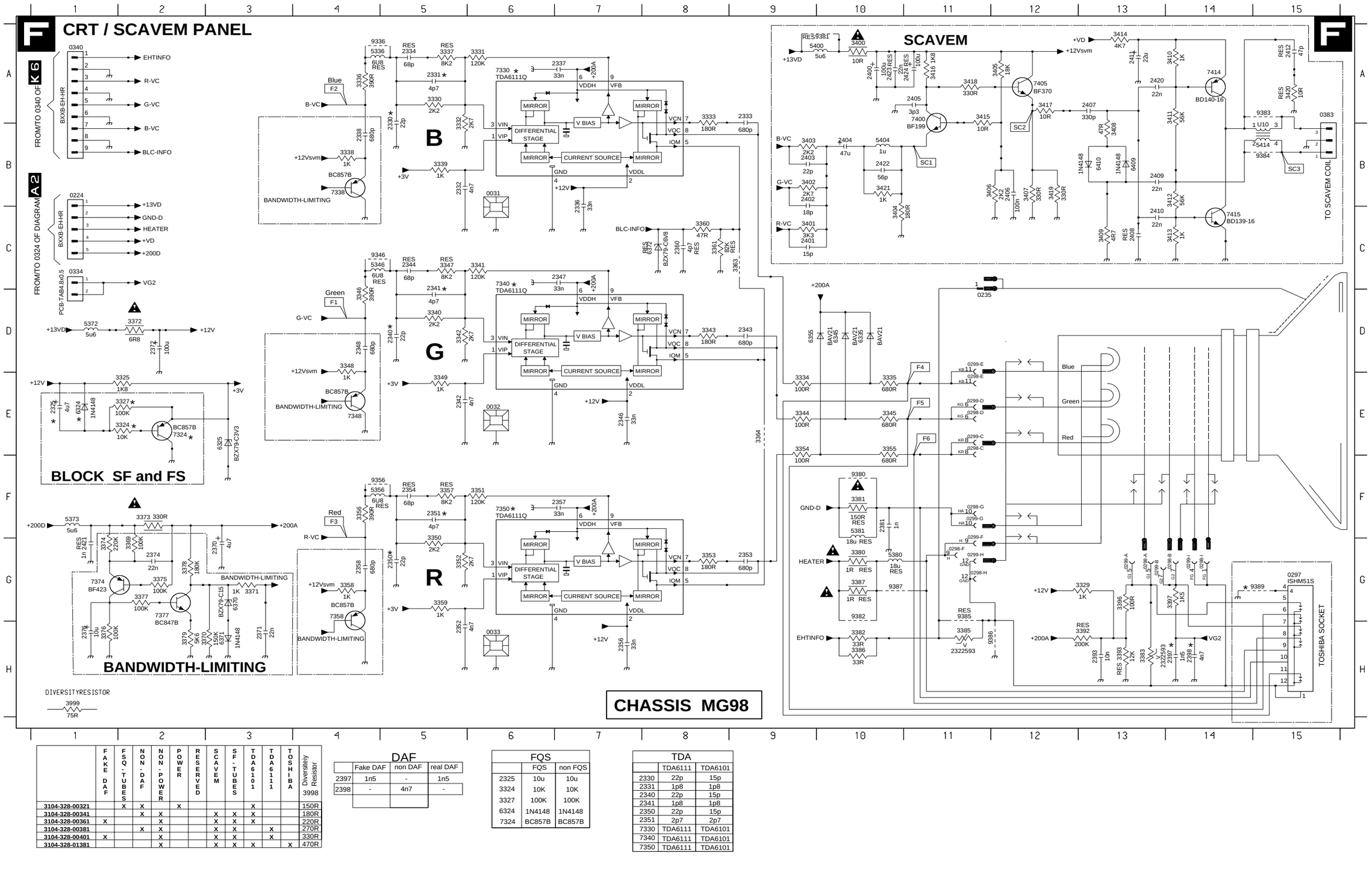
	NON DOLBY 2X15W	NON DOLBY 3X15W	DOLBY 3X15W	DOLBY 4X15W
3700	1K	1K	3K9	3K9
3701	180R	180R		
3702	1K	1K	3K9	3K9
3703	180R	180R		
3704			10K	10K
3705			15K	15K
3706				15K
3707				
3710	100K	100K		
3711	10K		10K	
3712	8K2		8K2	
3713	82K		82K	
3714	5K6		5K6	
3715		68K		
3716		68K		
3717		27K		10R
3718		39K		150K
3719		10K		4K7
3720	100K	47K		
3721	10K	10K		
3722	8K2	10K		
3723	82K	120K	1K	1K
3724	5K6	8K2		
3725			1K	1K
3730	470R	470R	470R	470R
3731	6K8	6K8	8K2	8K2
3732	470R	470R	470R	470R
3733	6K8	6K8	8K2	8K2
3734	4K7	470R		

	NON DOLBY 2X15W	NON DOLBY 3X15W	DOLBY 3X15W	DOLBY 4X15W
3735		6K8		56K
3736			470R	470R
3737			6K8	6K8
3758		6K8	6K8	6K8
3781		8R2	8R2	8R2
3782		100K	100K	100K
3783		100K	100K	100K
3784		8R2	8R2	8R2
4700	X		X	
4701				
4702		X		X
4705	X			
4707	X			
4708				X
4709	X	X		
4710				X

	NON DOLBY 2X15W	NON DOLBY 3X15W	DOLBY 3X15W	DOLBY 4X15W
4711			X	
4726			X	X
4727			X	X
6700	X		X	
6701	X		X	
6710	X	X		
6711	X	X		
7750		TDA2610Q	TDA2610Q	TDA2610Q
9701	X	X		X
9703		X	X	X
9706		X	X	X
9709	X			
9742			X	X
9752		X	X	X

7 Electrical diagrams and print lay-outs

0031 B6 0298-F G11 0299-H G11 2336 B7 2350 G5 2372 D2 2404 B10 2422 B10 3334 E9 3345 F10 3356 F4 3372 D2 3383 H13 3403 B9 3414 A13 5356 F4 6345 D10 7348 E4 9356 F4
0032 E6 0298-G F11 0299-I G14 2337 A7 2351 F6 2374 G2 2405 A10 2423 A10 3335 E10 3346 D4 3357 F5 3373 F2 3386 H11 3404 B11 3415 A11 5372 D1 6355 D9 7356 F6 9380 F10
0033 H6 0298-H G11 0334 C1 2338 B4 2352 H6 2374 H1 2406 B11 2424 A10 3336 A4 3347 C5 3373 G1 3385 H10 3405 B12 3416 A11 5373 F1 6370 C2 7358 C4 9381 A9
0224 B1 0298-I G14 0340 A1 2340 D5 2353 G9 2381 F10 2407 A13 3254 F2 3337 A5 3348 D4 3374 G2 3387 G10 3406 B12 3417 A12 5380 G10 6371 H2 7374 G1 9382 G10
0235 D11 0299-A G13 0383 A15 2341 D5 2354 F5 2393 H13 2408 C13 3325 E5 3338 B4 3349 E5 3375 G2 3388 G10 3407 B12 3418 A11 5381 F10 6372 C8 7377 G2 9383 A15
0297 C15 0299-B G13 2325 E1 2342 E5 2356 H7 2397 H14 2409 B13 3327 F2 3339 B5 3350 G5 3376 H1 3392 H13 3408 B12 3419 B12 5400 A9 6409 B12 7409 A11 9384 B15
0298-A G13 0299-C F17 2330 A5 2343 D9 2357 F7 2398 H14 2410 C13 3329 G13 3340 D5 3351 F6 3377 G2 3393 G13 3409 C13 3420 A15 5404 B10 6410 B13 7405 A12 9385 G11
0298-B G14 0299-D E11 2331 A5 2344 C5 2358 G4 2400 A10 2411 A13 3330 A5 3341 C6 3352 G6 3378 G5 3394 G13 3410 A14 3421 B10 5414 B15 7324 E2 7414 A14 9386 H12
0298-C F11 0299-E D11 2332 B6 2346 E7 2359 G8 2401 C9 2412 A15 3331 A6 3342 D6 3353 G8 3379 H2 3397 G14 3411 A14 3989 H1 5224 E1 7330 A6 7415 C14 9387 C10
0298-D E11 0299-F C11 2333 A9 2347 C7 2370 G3 2402 B9 2420 A13 3332 A5 3343 D8 3354 G9 3380 C10 3400 A9 3412 C14 5336 A4 6325 E3 7338 B4 9336 A4 9388 G15
0298-E E11 0299-G F11 2334 A5 2348 D4 2371 H3 2403 B9 2421 G1 3333 A8 3344 E9 3355 E10 3371 G3 3382 H10 3402 B9 3413 C14 5346 C4 6335 D10 7340 C6 9346 C4 9389 G15



	FAKE DAF	FSQ-TUBES	NON-DAF	NON-POWER	POWER	RESERVED	SCAVEM	SF-TUBES	TDA6101	TDA6111	TOSHIBA	Diversitiely Resistor
												3998
3104-328-00321		X	X		X				X			150R
3104-328-00341			X	X			X	X	X			180R
3104-328-00361	X			X			X	X	X			220R
3104-328-00381			X	X			X	X		X		270R
3104-328-00401	X			X			X	X		X		330R
3104-328-01381				X			X	X	X		X	470R

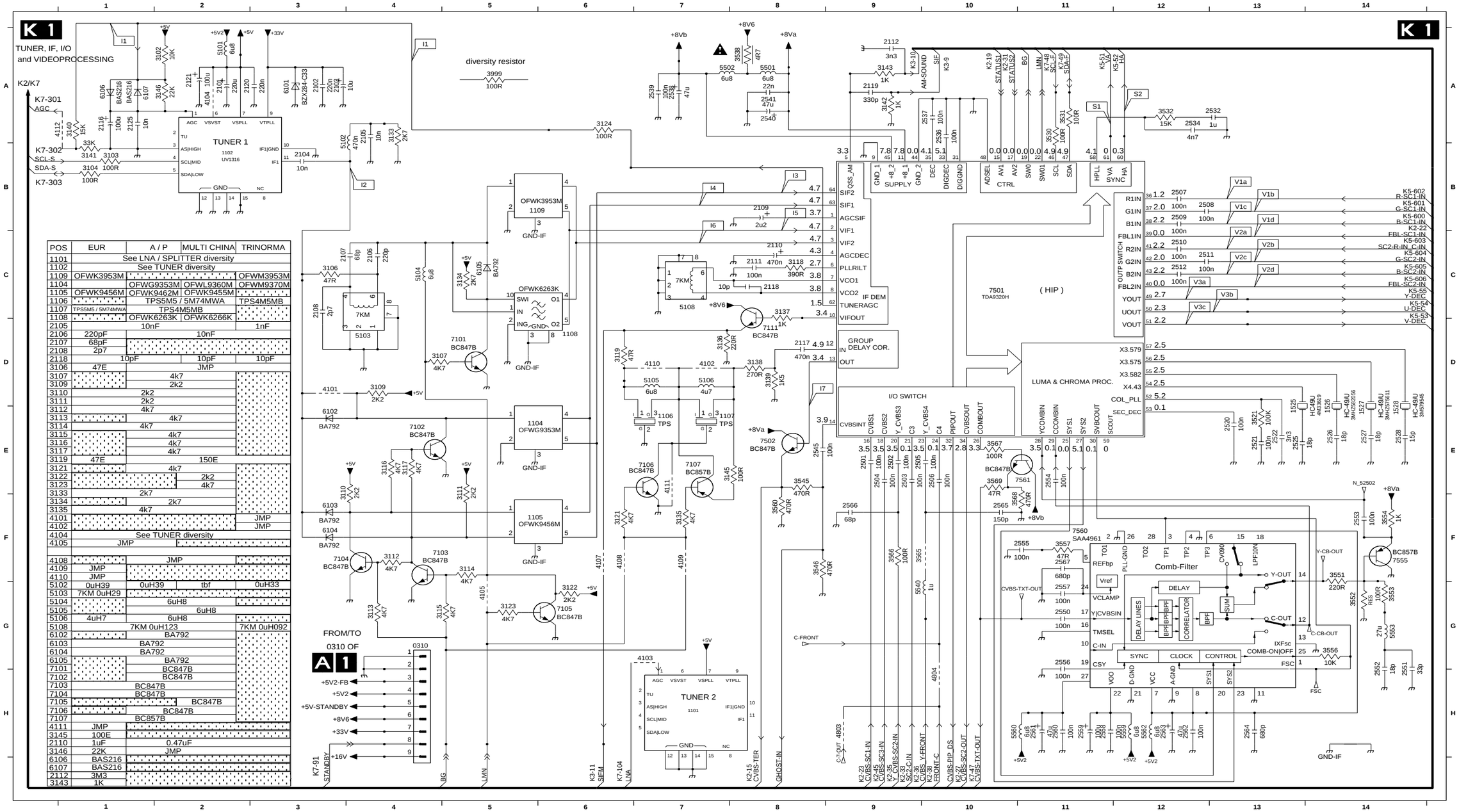
DAF

	Fake DAF	non DAF	real DAF
2397	1n5	-	1n5
2398	-	4n7	-

	FQS	non FQS
2325	10u	10u
3324	10K	10K
3327	100K	100K
6324	1N4148	1N4148
7324	BC857B	BC857B

	TDA	
	TDA6111	TDA6101
2330	22p	15p
2331	1p8	1p8
2340	22p	15p
2341	1p8	1p8
2350	22p	15p
2351	2p7	2p7
7330	TDA6111	TDA6101
7340	TDA6111	TDA6101
7350	TDA6111	TDA6101

0310 G4	1108 C5	2102 A3	2109 B8	2119 A9	2504 E9	2511 C12	2527 E14	2539 A7	2553 F14	2560 H11	2567 F11	3110 E3	3117 E4	3133 A4	3140 A1	3530 A11	3552 G14	3566 F9	4103 G7	4111 E7	5104 C4	5553 G14	6104 F3	7104 F4	7555 F14
1101 H7	1109 B5	2103 A3	2110 C8	2120 A2	2505 E9	2512 C12	2528 E14	2540 A8	2554 E11	2561 H11	3102 A2	3111 E5	3118 C8	3134 C5	3141 B1	3531 A11	3553 G14	3567 E10	4104 A2	4112 A1	5105 D7	5559 H12	6105 C5	7105 G6	7560 F11
1102 B2	1525 D13	2104 B3	2111 C8	2121 A2	2506 E10	2520 E13	2532 A13	2541 A8	2555 F11	2562 H12	3103 B1	3112 F4	3119 D6	3135 F7	3142 A9	3532 A12	3554 F14	3568 F10	4105 G5	4803 H9	5106 D7	5560 H10	6106 A1	7106 E7	7561 E10
1104 E5	1526 D14	2105 A4	2112 A9	2125 A1	2507 B12	2521 E13	2534 A12	2545 E8	2556 G11	2563 H12	3104 B1	3113 G4	3121 F6	3136 D7	3143 A9	3538 A8	3556 G14	3569 E10	4107 F6	4804 H10	5108 C7	5562 H12	6107 A1	7107 E7	
1105 F5	1527 E14	2106 C4	2116 A1	2501 E9	2508 B12	2522 E13	2536 A10	2550 G11	2557 G11	2564 H13	3106 C3	3114 F5	3122 G6	3137 C8	3145 E7	3545 E8	3557 F11	3999 A5	4108 F6	5101 A2	5501 A8	6101 A3	7101 D5	7111 D8	
1106 E7	1528 E14	2107 C3	2117 D8	2502 E9	2509 B12	2525 E13	2537 A10	2551 G14	2558 H11	2565 F10	3107 D4	3115 G4	3123 G5	3138 D8	3146 A2	3546 F8	3560 F8	4101 D3	4109 F7	5102 A3	5502 A7	6102 E3	7102 E4	7501 C10	
1107 E7	2101 A2	2108 C3	2118 C8	2503 E9	2510 C12	2526 E14	2538 A7	2552 G14	2559 H11	2566 F9	3109 D4	3116 E4	3124 A6	3139 D8	3521 E13	3551 F14	3565 F9	4102 D7	4110 D7	5103 D4	5540 G9	6103 F3	7103 F5	7502 E8	



POS	EUR	A / P	MULTI CHINA	TRINORMA
1101	See LNA / SPLITTER diversity			
1102	See TUNER diversity			
1109	OFWK3953M			OFWM3953M
1104		OFWG9353M	OFWL9360M	OFWM9370M
1105	OFWK9456M	OFWK9462M	OFWK9455M	
1106		TPS5M5 / 5M74MWA		TPS4M5MB
1107	TPS5M5 / 5M74MWA	TPS4M5MB		
1108		OFWK6263K	OFWK6266K	
2105	10nF			1nF
2106	220pF	10nF		
2107	68pF			
2108	2p7			
2118	10pF	10pF	10pF	
3106	47E	JMP		
3107	4k7			
3109	2k2			
3110	2k2			
3111	2k2			
3112	4k7			
3113	4k7			
3114	4k7			
3115	4k7			
3116	4k7			
3117	4k7			
3119	47E	150E		
3121	4k7			
3122	2k2			
3123	4k7			
3133	2k7			
3134	2k7			
3135	4k7			
4101	JMP			
4102	JMP			
4104	See TUNER diversity			
4105	JMP			
4108	JMP			
4109	JMP			
5102	0uH39	0uH39	tbf	0uH33
5103	7KM 0uH29			
5104	6uH8			
5105	6uH8			
5106	4uH7	6uH8		
5108	7KM 0uH123			7KM 0uH092
6102	BA792			
6103	BA792			
6104	BA792			
6105	BA792			
7101	BC847B			
7102	BC847B			
7103	BC847B			
7104	BC847B			
7105	BC847B			
7106	BC847B			
7107	BC857B			
4111	JMP			
3145	100E			
2110	1uF	0.47uF		
3146	22K	JMP		
6106	BAS216			
6107	BAS216			
2112	3M3			
3143	1K			

Main HIP		LOW			TOP	
Pinnr	PinName	100Hz ECO Eur	50Hz Eur	1FH AP/US	100Hz Med/Top Eur	100 Hz AP
15	INPUT	STATUS1	STATUS1	Ext1AR	STATUS1	Ext1 AR
17	INPUT	STATUS2	STATUS2	Ext2AR	STATUS2	Ext2 AR
22	OUTPUT	L'	L'	M	L'	M

POS	EUR LOW	EUR TOP	A/P MULTI	A/P NTSC KOREA	A/P NTSC TAIWAN LOW	A/P NTSC TAIWAN TOP	ARGENTINA	USA
1102	UV1316/AI-2	UV1316/AP-2	UV1316/AP-2	UV1336B/AP	UV1336B/APS	UV1336B/APS	UV 1336B/AP	UV1336B/AP
1101		PS1311 / I	PS1315 / I	PS1315 / P		PS1311	PS1315 / I	

INPUT / OUTPUT

SCART 1 1201-A

SCART 2 1202-A

SCART 3 1201-B

SCART 4 1202-B NOT FOR MG2.1E

SNDR-SC1-OUT K3-13

SNDL-SC1-OUT K3-14

K8-1 IN-SC1-SNDR

K3-16 4229 SNDR-SC1-IN

4230 SNDL-SC1-IN K8-2

K5-18 IN-SC1-B

K1-19 STATUS1

K5-20 IN-SC1-G

K1-21 IN-SC1-R

K1-22 FBL-SC1-IN

K1-23 CVBS-SC1-IN

K3-24 SNDR-SC2-OUT

K3-25 SNDL-SC2-OUT

16:9-ARFRONT C7-26

4201 AP-ONLY

IO-BUS K7-201

K3-28 SNDR-SC2-IN

K3-29 SNDL-SC2-IN

K5-30 IN-SC2-B

K1-31 STATUS2

IN-SC2-G K5-32

K5-33 IN-C_IN-R-SC2

K5-34 IN-SC2-FBL

K1-35 Y_CVBS-SC2-IN

K8-3 IN-SC2-CVBS_Y

CVBS-TER K1-15

7200 BC547B

SNDR-CL_VL-OUT K3-101

SNDL-CL_VL-OUT K3-100

0381

CINCH-OUT

RIGHT

LEFT

1200-A 4YKC21-2675

1200-C 6 YKC21-2675

1200-B 5YKC21-2675

SNDS-VL-OUT K4-23

SNDS-VR-OUT K4-22

K1 / K7

SNDR-SC3-IN K3-42

SNDL-SC3-IN K3-43

K7-44 P2-6

CVBS-SC3-IN K1-45

K1-27 CVBS-SC2-OUT 100R

7201 BC547B

7203 BC557B

7204 BC847B

C-7-OUT

OR 1K5 IF 4 SCARTS

AP-ONLY 16:9-ARFRONT

CVBS_Y-FRONT FRONT-Y_CVBS

FRONT-C

IN-FRONT-SNDL

SNDL-FRONT-IN

FRONT-DETECT

SNDR-FRONT-IN

IN-FRONT-SNDR

K1-36

K1-38

K3-39

K7-40

K3-41

0333

FROM / TO 0333 OF

SIDE I/O PANEL

SNDR-SC4-IN

SNDL-SC4-IN

P1-0 K7-96

CVBS-SC4-IN K8-4

	LOW			TOP	
PinName	100Hz ECO Eur	50Hz Eur	1FH AP/US	100Hz TOP/MED Eur	100Hz AP
P1-0			MAINS CLOCK	STATUS4	MAINS CLOCK
P1-4	I/O_CNTRL_BUS IN	I/O_CNTRL_BUS IN	16:9 ARFRONT	I/O_CNTRL_BUS IN	16:9 ARFRONT
P2-6		STATUS3	Ext2 FRONT	STATUS3	
P3-7	I/O_CNTRL_BUS OUT	I/O_CNTRL_BUS OUT	REMOTE LOCATOR	I/O_CNTRL_BUS OUT	

0333 F7 3249 F8
0381 D2 3250 F7
1200-A E1 3252 E8
1200-B E2 3253 E8
1200-C E1 3254 E4
1201-A A3 3255 E4
1201-B D3 3256 G4
1202-A A10 3257 F2
1202-B D10 3258 F1
2202 B2 3264 F3
2203 B2 3265 F4
2204 C2 3266 E8
2205 C2 3270 E11
2206 B3 3271 E11
2209 B3 3273 F11
2210 B4 3274 G11
2212 D6 4201 B6
2213 D6 4226 G6
2215 B7 4227 G6
2216 B7 4228 F6
2217 B11 4229 A5
2219 B11 4230 A5
2220 B11 4235 D12
2221 F7 6200 B1
2222 F9 6201 B1
2224 E4 6202 B1
2226 F4 6203 B1
2228 G2 6204 D2
2229 G2 6205 A4
2240 E11 6206 B4
2241 F11 6207 B4
3200 B2 6208 B5
3201 B2 6209 B5
3202 A2 6210 C3
3203 A2 6211 D3
3204 C2 6212 D3
3205 C1 6213 D3
3206 D2 6214 B6
3207 D1 6215 B6
3208 D12 6216 B6
3209 D3 6217 B6
3210 D4 6218 C7
3211 D4 6219 D7
3212 D12 6220 A11
3213 C3 6221 B11
3215 B4 6222 B11
3216 B4 6223 B12
3218 B3 6224 B12
3219 B4 6225 C10
3220 A3 6226 D10
3221 B7 6227 D11
3222 B7 6228 D10
3223 A7 6229 E4
3224 A7 6230 E4
3225 D6 6231 E4
3227 G12 6232 F4
3228 E6 6233 G3
3229 E6 6234 G1
3230 E6 6235 G1
3231 G12 6236 G2
3232 E7 6237 G2
3235 D11 6239 B10
3236 D11 6240 E12
3240 C11 6241 E12
3241 B11 6242 E11
3242 B12 6243 F11
3243 F8 6244 G11
3244 B11 6259 B2
3245 B11 7200 C2
3246 A11 7201 E6
3247 F8 7203 E9
3248 F8 7204 F8

SOUND PROCESSING

*	DOLBY	NO DOLBY
4700	RES	YES
4701	RES	YES
4702	RES	YES
4703	RES	YES
3897	4K7	RES
3762	4K7	RES
3898	100R	RES
3782	100R	RES
7753	YES	RES
3892	2K7	0R
3890	2K7	0R
3893	1K	RES
3891	1K	RES
3760	47K	68K
3758	47K	68K

**	SC3	NO SC3
3792	6K8	RES
3793	6K8	RES
3794	22K	RES
3795	22K	RES
2806	220nF	RES
2807	220nF	RES

0328 C14
0344 E12
1751 G7
2751 D3
2752 D3
2753 D3
2754 E3
2755 E3
2756 E3
2757 F3
2758 F3
2759 F3
2760 F3
2761 F2
2762 G2
2763 G3
2764 G3
2765 H2
2766 H2
2767 H7
2768 H7
2769 B9
2770 A10
2771 C10
2772 C10
2773 D8
2774 D9
2775 A9
2776 B10
2777 E8
2778 E8
2779 E8
2780 E8
2781 E9
2782 E9
2783 D10
2784 E9
2785 E8
2786 E8
2790 F10
2791 E11
2792 D11
2793 E10
2797 I12
2798 G12
2799 I12
2800 H12
2801 D3
2802 E2
2803 E2
2804 E2
2805 E2
2806 F2
2807 F2
2808 B7
2809 B7
2810 H2
2811 H3
2846 F8
2847 F8
2848 F8
2849 G9
2890 C8
2891 C8
3751 G1
3752 G2
3753 G1
3754 F1
3755 C3
3756 C3
3758 C10
3760 A10
3761 C9
3762 A12
3765 E10
3766 E10
3767 E11
3768 E11
3769 G9
3770 G9
3771 H9
3772 I9
3773 G11
3776 H12
3777 G11
3778 I12
3779 I11
3780 A9
3781 D1
3782 A12
3783 F11
3784 E1
3785 E1
3786 E1
3787 E2
3788 E1
3789 E1
3790 F1
3791 F2
3792 F1
3793 F1
3794 F1
3795 F2
3796 E12
3797 E12
3798 C11
3799 B11
3830 E12
3831 F12
3832 B8
3833 B8
3839 B6
3840 B9
3841 B6
3844 A9
3845 C9
3846 D11
3847 E10
3890 D12
3891 D12
3892 D12
3893 D12
4700 D13
4701 D13
4702 A12
4703 C12
4720 F11
4721 I12
5751 G2
5752 H2
5753 B7
6751 D2
6752 B8
6753 D8
6754 D8
6755 F8
6756 F8
6757 B7
7751 C3
7752 G10
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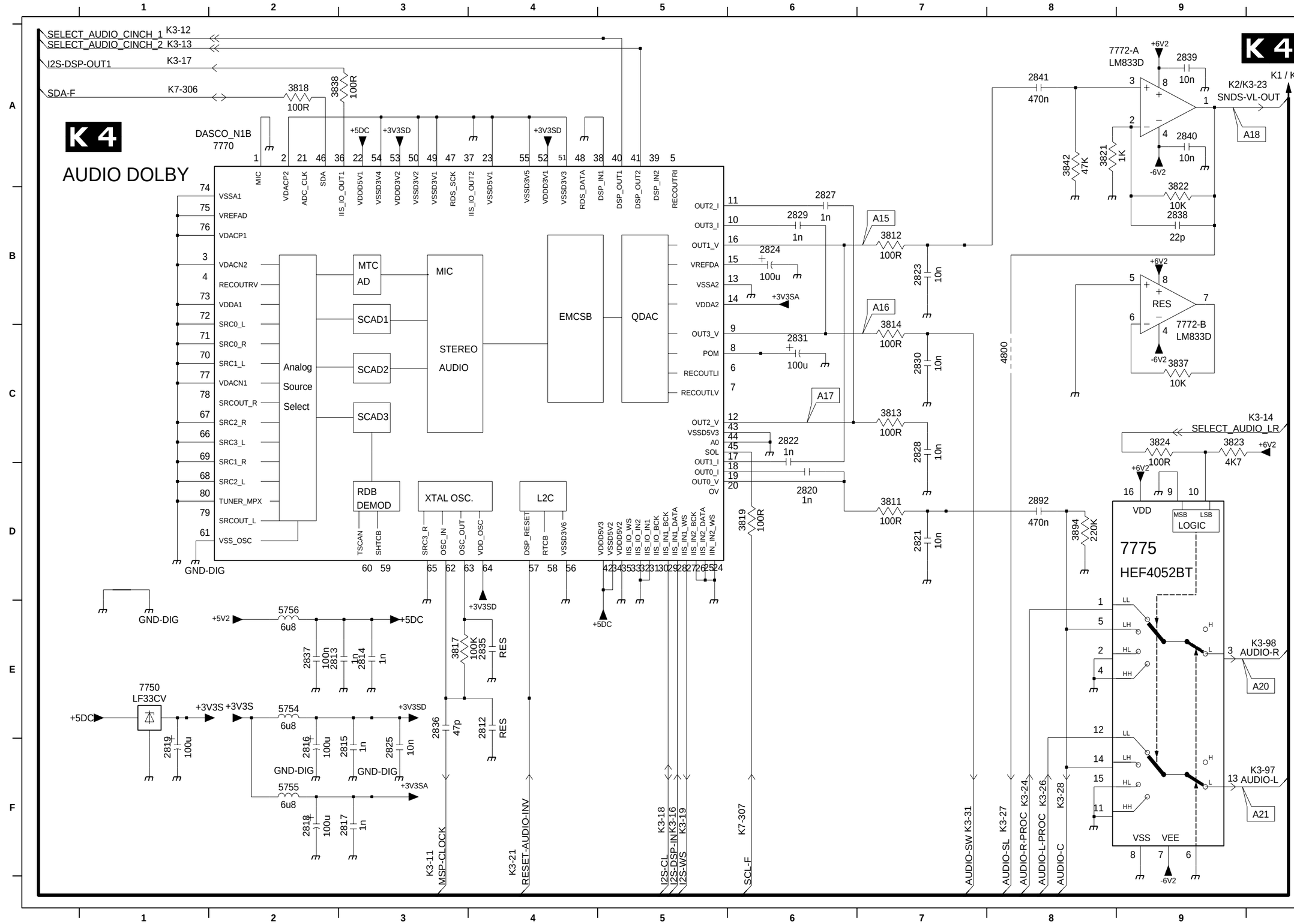
7757-B D12
7758-A G11
7758-B H11
7774 C8



2812 E4
2813 E2
2814 E3
2815 F3
2816 F2
2817 F3
2818 F2
2819 F1
2820 D6
2821 D7
2822 C6
2823 B7
2824 B6
2825 F3
2827 B6
2828 C7
2829 B6
2830 C7
2831 C6
2835 E4
2836 E3
2837 E2
2838 B9
2839 A9
2840 A9
2841 A8
2892 D8
3811 D7
3812 B7
3813 C7
3814 C7
3817 E3
3818 A2
3819 D6
3821 A8
3822 B9
3823 C9
3824 C9
3837 C9
3838 A2
3842 A8
3894 D8
4800 C8
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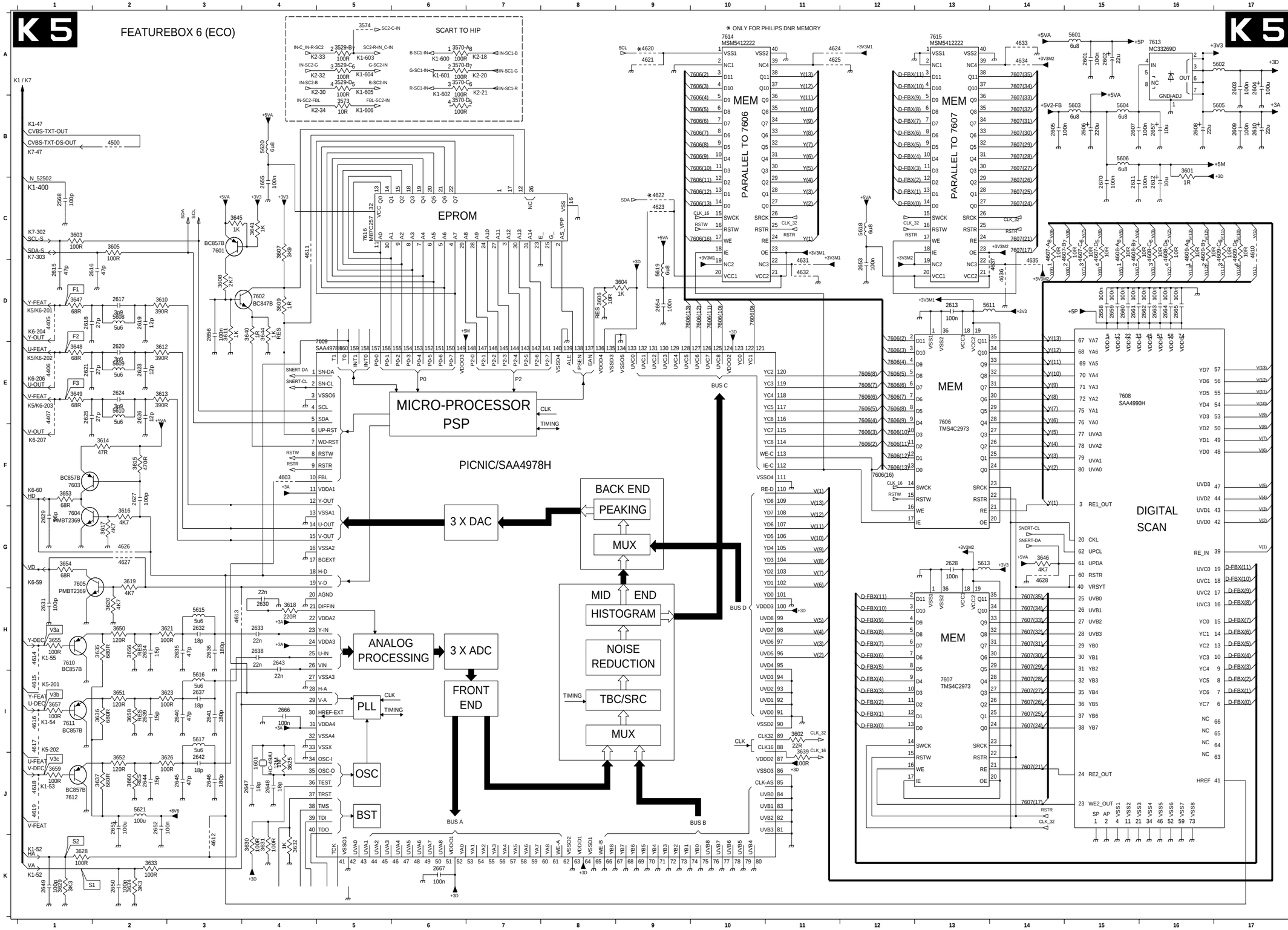
5755 F2
5756 E2
7750 E1
7770 A2
7772-A A8
7772-B C9
7775 D9



1601 J4	3634 K2	4607-A C14	5601 A15
2568 C1	3635 H2	4607-B C15	5602 A17
2601 A15	3636 I2	4607-C C15	5603 B15
2602 A15	3637 J2	4607-D C15	5604 B15
2603 A17	3639 J11	4608-A C15	5605 B17
2604 A17	3640 D4	4608-B C15	5606 B15
2605 B14	3641 C4	4608-C C16	5608 D2
2606 B15	3644 D4	4608-D C16	5609 E2
2607 B15	3645 C3	4609-A C16	5610 E2
2608 B16	3646 G14	4609-B C16	5611 D13
2609 B17	3647 D1	4609-C C17	5613 G13
2610 B17	3648 E1	4609-D C17	5615 H3
2611 C15	3649 E1	4610 C17	5616 I3
2612 C16	3650 H2	4611 C4	5617 I3
2613 D13	3651 I2	4612 K3	5618 C12
2615 D1	3652 J2	4613 H3	5619 D9
2616 D2	3653 F1	4614 H1	5620 B4
2617 D2	3654 G1	4615 I1	5621 J2
2618 D1	3655 H1	4616 I1	7601 C3
2619 D2	3656 H2	4617 I1	7602 D4
2620 E2	3657 I1	4618 J1	7603 F1
2621 E1	3658 I2	4619 J1	7604 G1
2623 E2	3659 J1	4620 A9	7605 G1
2624 E2	3660 J2	4621 A9	7606 F13
2625 E1	4405 D1	4622 C9	7607 I13
2626 E2	4406 E1	4623 C9	7608 E15
2627 F2	4407 E1	4624 A11	7609 E4
2628 G13	4500 B2	4625 A11	7610 H1
2629 G1	4603 F4	4626 G2	7611 I1
2630 H4	4607-A C14	4627 G2	7612 J1
2631 H1	4607-B C15	4628 G14	7613 A16
2632 H3	4607-C C15	4631 D11	7614 A10
2633 H4	4607-D C15	4632 D11	7615 A13
2634 H2	4608-A C15	4633 A14	7616 C5
2635 H3	4608-B C15	4634 A14	
2636 H3	4608-C C16	4635 D14	
2637 I3	4608-D C16	4636 D14	
2638 H4	4609-A C16	4637 D14	
2639 I2	4609-B C16	5601 A15	
2640 I3	4609-C C17	5602 A17	
2641 I3	4609-D C17	5603 B15	
2642 J3	4610 C17	5604 B15	
2643 H4	4611 C4	5605 B17	
2644 J2	4612 K3	5606 B15	
2645 J3	4613 H3	5608 D2	
2646 J3	4614 H1	5609 E2	
2647 J4	4615 I1	5610 E2	
2648 J4	4616 I1	5611 D13	
2649 K1	4617 I1	5613 G13	
2650 K2	4618 J1	5615 H3	
2651 J2	4619 J1	5616 I3	
2652 J2	4620 A9	5617 I3	
2653 D12	4621 A9	5618 C12	
2654 D9	4622 C9	5619 D9	
2655 C4	4623 C9	5620 B4	
2656 D3	4624 A11	5621 J2	
2657 B16	4625 A11	7601 C3	
2658 D15	4626 G2	7602 D4	
2659 D15	4627 G2	7603 F1	
2660 D15	4628 G14	7604 G1	
2661 D15	4631 D11	7605 G1	
2662 D16	4632 D11	7606 F13	
2663 D16	4633 A14	7607 I13	
2664 D16	4634 A14	7608 E15	
2665 D16	4635 D14	7609 E4	
3529-B A5	4636 D14	7610 H1	
3529-C A5	4637 D14	7611 I1	
3529-D A5	5601 A15	7612 J1	
3570-A A6	5602 A17	7613 A16	
3570-B A6	5603 B15	7614 A10	
3570-C A6	5604 B15	7615 A13	
3570-D B6	5605 B17	7616 C5	
3573 B5	5606 B15		
3574 A5	5608 D2		
3601 B16	5609 E2		
3602 I11	5610 E2		
3603 C1	5611 D13		
3604 D9	5613 G13		
3605 C2	5615 H3		
3606 D8	5616 I3		
3607 C4	5617 I3		
3608 D3	5618 C12		
3609 D4	5619 D9		
3610 D2	5620 B4		
3611 D3	5621 J2		
3612 E2	7601 C3		
3613 E2	7602 D4		
3614 F2	7603 F1		
3615 F2	7604 G1		
3616 G2	7605 G1		
3617 G2	7606 F13		
3618 H4	7607 I13		
3619 G2	7608 E15		
3620 H2	7609 E4		
3621 H3	7610 H1		
3623 I3	7611 I1		
3625 J4	7612 J1		
3626 J3	7613 A16		
3628 K1	7614 A10		
3629 K1	7615 A13		
3630 K4	7616 C5		
3631 K4			
3632 K4			
3633 K2			

K6

VIDEO CONTROL & GEOMETRY

K6

TOPIC

HOP

VIDEO CONTROLLER

DEFLECTION PROCESSOR

	LOW			TOP	
PinName	100Hz ECO Eur	50Hz Eur	1FH AP/US	100Hz TOP/MED Eur	100Hz AP
P2-7			RESET GEMSTAR	RGB1FH/FRONT UI	H SEL

0311 G12 3342 H6
0315 D12 3343 H5
0340 C10 3344 H5
0360 H12 3345 H6
1305 H3 3350 G9
2300 E2 3351 G9
2301 F1 3352 H8
2302 F1 3353 H8
2303 F2 3369 E7
2304 F2 3370 E7
2305 I2 3400 C7
2306 I3 3401 C7
2307 G1 3402 D7
2308 G1 3404 B8
2309 E2 3405 B8
2310 E2 3406 C9
2311 E2 3407 B8
2312 H4 3408 B8
2313 H4 3409 B9
2315 H5 3412 B8
2321 G8 3413 B8
2322 G8 3414 C8
2323 G7 3420 E8
2325 G8 3422 E8
2331 F8 3423 E9
2340 H7 3424 E9
2343 H5 3425 D10
2344 H6 3426 D10
2351 G9 3427 E10
2400 C9 3428 D7
2401 C9 3429 D8
2402 B9 3430 D8
2403 C5 3431 C4
2404 C5 3432 C1
2405 C5 3433 C1
2406 C2 3434 A4
2407 C2 3435 B5
2408 D2 3436 B1
2410 D2 3437 C1
2411 D2 3438 C4
2412 D2 3439 D7
2414 B1 3440 D7
2415 B1 3441 D7
2416 B1 4311 G2
2417 C1 4408 C4
2418 B4 4410 D1
2419 B4 4420 B5
2422 E8 4425 C1
2423 E9 4426 H1
2424 D9 4427 H1
2425 C6 5300 E1
2426 D7 5301 F1
2427 B1 5302 F1
2428 D8 5305 C7
2429 C8 5306 C8
2430 C8 5307 D7
3300 E1 6300 E1
3302 F2 6310 I4
3303 E2 6311 I4
3304 E2 6334 F8
3306 H3 6340 H7
3307 F1 6341 H7
3308 F1 6344 H5
3309 H4 6350 G10
3310 G3 6354 H8
3311 H4 6420 E8
3312 H4 6422 E8
3313 G4 6424 E10
3314 H4 6429 D8
3315 H5 6430 H3
3316 G5 6431 D7
3317 F1 7300 C6
3318 G2 7341 H6
3320 E7 7351 H9
3321 F8 7402 A1
3322 F8 7403 B5
3323 F7 7418 D8
3325 G8 7419 C8
3326 G8 7420 C9
3330 F8 7424 E10
3331 E7 7438 D9
3332 F8
3334 F9
3340 H7
3341 G6

0341 B5 2005 B14 2013 J10 2021 J8 2029 J16 2040 B6 3001 C6 3004-D C9 3009-B D9 3016 I5 3023-B K11 3027-D E9 3030-C J14 3034 I7 3042 K15 3049-B C1 3051-B D1 3053-B E1 3055-B F1 3057-B H1 3068 D4 3076 G9 3895 J2 4009 C3 6002 G4 6017 F5 6238 J3 7007 K16 7015 K17
0355 B4 2006 F13 2014 H9 2022 J10 2030 J15 2041 K14 3003-A D9 3005-A C9 3009-C B8 3017 J5 3023-C K12 3028-A E9 3030-D J14 3035 H7 3043 J16 3049-C C1 3051-C D1 3053-C E1 3055-C G1 3057-C H1 3069 K13 3076 K17 6003 G6 6019 F5 6250 I3 7008 H8 7016 K16
0356 B3 2007 J16 2015 I9 2023 J9 2031 B17 2042 K14 3003-B D9 3005-B C9 3009-D B9 3018 J5 3023-D K12 3028-B E9 3031 F9 3036-A G7 3047 J9 3049-D C1 3051-D D1 3053-D F1 3055-D G1 3057-D H1 3070 K16 3078 J7 4002 H2 4011 F3 6004 F4 6021 G6 7001 F14 7009 J15 7017 K7
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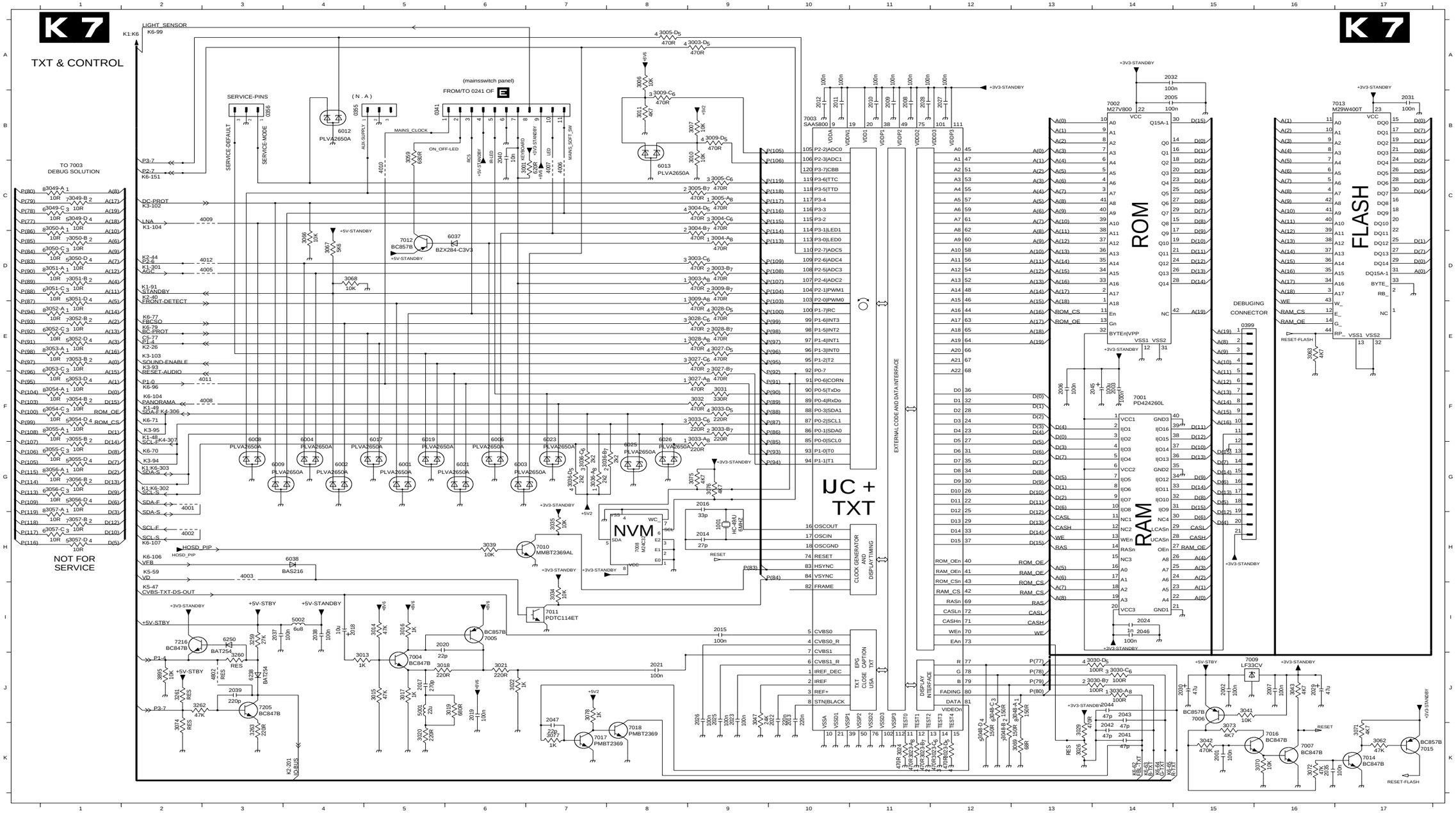
1001 H9 2009 B11 2017 J5 2025 J9 2033 K16 2044 J14 3003-D A9 3005-D A8 3011 B8 3020 K5 3026 K13 3028-D E9 3033-A F9 3036-C G7 3048-B K12 3050-B D1 3052-B E1 3054-B F1 3056-B G1 3062 K17 3072 K16 3260 J3 4005 D3 4802 J3 6008 F3 6025 G8 7003 B10 7011 I7 7205 J3
2001 K15 2010 B11 2018 I4 2026 J9 2037 I3 2045 F14 3004-A D9 3006 A8 3013 J4 3021 J6 3027-A F9 3029 K13 3033-B F9 3036-D G7 3048-C J12 3050-C D1 3052-C E1 3054-C F1 3056-C G1 3063 E16 3073 K15 3261 J2 4006 C7 5001 J5 6009 G3 6026 F8 7004 J5 7012 D5 7216 I2
2002 J15 2011 B10 2019 J6 2027 B12 2038 I4 2046 I14 3004-B C9 3007 B9 3014 I5 3022 J6 3027-B E9 3030-A J14 3033-C F9 3039 H6 3048-D K12 3050-D D1 3052-D E1 3054-D F1 3056-D G1 3066 D4 3074 K2 3262 J2 4007 C7 5002 I4 6012 B4 6037 D6 7005 I6 7013 B16
2003 F14 2012 B10 2020 I5 2028 B11 2039 J3 2047 J7 3004-C C9 3009-A D9 3015 J5 3023-A K11 3027-C E9 3030-B J14 3033-D F9 3041 J15 3049-A C1 3051-A D1 3053-A E1 3055-A F1 3057-A G1 3067 D4 3075 G9 3263 K3 4008 F3 6001 G5 6013 C8 6038 H4 7006 J15 7014 K17



	LOW			TOP	
PinName	100Hz ECO Eur	50Hz Eur	1FH AP/US	100Hz TOP/MED Eur	100Hz AP
P1-0			MAINS CLOCK	STATUS4	MAINS CLOCK
P1-4	I/O_CNTRL_BUS IN	I/O_CNTRL_BUS IN	16:9 ARFRONT	I/O_CNTRL_BUS IN	16:9 ARFRONT
P2-6		STATUS3	Ext2 FRONT	STATUS3	
P2-7			RESET GEMSTAR	RGB1FH/FRONT UI	H SEL
P3-7	I/O_CNTRL_BUS OUT	I/O_CNTRL_BUS OUT	REMOTE LOCATOR	I/O_CNTRL_BUS OUT	